

Motion to Intervene Briefing

	X	
UNITED STATES OF AMERICA and	:	
STATE OF INDIANA,	:	
	:	
Plaintiffs,	:	
	:	Civil Action No. 2:14-cv-00312
v.	:	
	:	The Honorable Philip P. Simon
ATLANTIC RICHFIELD COMPANY and	:	
E.I. DU PONT DE NEMOURS AND	:	
COMPANY,	:	
	:	
Defendants.	:	
	X	

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INTRODUCTION

On September 3, 2014, the United States, on behalf of the United States Environmental Protection Agency, and the State of Indiana (collectively, "the Government") filed this CERCLA action against Defendants Atlantic Richfield Company and DuPont, two of the companies responsible for polluting the USS Lead Superfund Site (the "Site") in East Chicago, Indiana. Along with the Complaint, the Parties simultaneously filed a Consent Decree implementing their pre-negotiated plan to remediate the Site.

Now, two years later, this action still presents a pressing public health and environmental crisis that threatens the safety and property of thousands of residents in East Chicago, Indiana. Applicants seek to intervene in this action to protect themselves and their neighbors against these serious threats, and they are afforded the absolute right to do so under CERCLA § 113(i) (42 U.S.C. § 9613(i)) and Federal Rule of Civil Procedure 24(a)(2) ("Rule 24(a)(2)"), which both provide for intervention as a matter of right when an ongoing action threatens the interests of non-parties. *See* 42 U.S.C. § 9613(i); Fed. R. Civ. P. 24(a)(2). Through intervention, Applicants can assure that EPA not only implements a remediation plan that meets the requirements of CERCLA and provides residents their statutory right to notice and comment, but also that EPA provides this low-income community of color the same protective and legally required clean-up practices that EPA is using at other Superfund sites.

Applicants live and/or own property in the Calumet neighborhood of East Chicago, Indiana, where 92% of residents are people of color and 77% of residents are considered low-income. (EPA, EJSCREEN Report (2016), at 3, attached hereto at Exhibit A.) From the early 1900s to 1985, the area where Applicants live was subjected to continuous toxic contamination by surrounding lead refineries and other manufacturing. The responsible companies, flouting environmental laws and disregarding the safety of nearby residents, polluted the soil in the

neighborhood with extremely dangerous levels of lead, arsenic, and other contaminants. Lead contamination is associated with severe health risks including various organ disorders, seizures, respiratory issues, behavioral problems, and learning disabilities, while arsenic and other contaminants are associated with increased risk of the development of skin, lung, and liver cancer as well as lymphoma.

Because of the severity of the contamination and the risks such contamination posed to residents' health, the neighborhood was added to Superfund's National Priorities List ("NPL") in 2009, triggering the Environmental Protection Agency's ("EPA") duty to investigate, select, and execute a remediation plan under CERCLA, 42 U.S.C. § 9601, *et seq.* Three years later in November 2012, EPA finally outlined the remediation plan in a document called a Record of Decision ("ROD"), which EPA must follow. Now, in November 2016, EPA has failed to implement the remediation plan outlined in the ROD.

During the seven years since the Site was added to the NPL, EPA also failed to inform, and at times has misled, Applicants about the contamination levels at their property and the threats to their health. The first time anyone living on the Site understood the severity of the problem was just three months ago, when the East Chicago Housing Authority ("ECHA") abruptly informed residents at the West Calumet Housing Complex ("Public Housing") that because soil testing revealed extremely high levels of lead and arsenic in the soil, ECHA planned to demolish the Public Housing and residents had a mere 60 to 90 days to move out.¹ Though EPA had begun soil testing in November 2014, it waited *eighteen months* to release *any* results to the residents or the City of East Chicago—usually, EPA confirms soil test results in six to eight weeks. In addition to delaying notice of the extremely high contamination levels at the

¹ The contamination also forced the indefinite closure of Carrie Gosch Elementary School, located across the street from the Public Housing, which underwent a \$14 million renovation in the late 1990s.

Public Housing, neither EPA nor any other government agency provided *any* guidance whatsoever to the residents who live in other areas of the Site—some just across the street from the Public Housing—about whether and how their properties were impacted by this apparently serious contamination and emergent need for evacuation. Six weeks later, on September 14, 2106, EPA finally began sending some letters regarding testing results to residents who live in the other areas of the Site. EPA characterized these results as based on recent testing, when in fact the testing at many of the properties was completed *five years ago*.

As EPA haphazardly attempted to provide more information to residents regarding the contamination, Applicants also learned that the remediation plan implemented by the Consent Decree issued in this case actually omitted the remediation of an entire residential area adjacent to the Public Housing, even though such omission directly violated the remediation plan outlined in the ROD that EPA is legally required to follow. Applicants have since discovered that the ROD itself was based on severely flawed and incomplete data that further threatens the health and safety of the residents.

It is no surprise that this combination of inaction and failure to inform, followed by drastic, last minute measures, have created wide-spread anxiety among the residents. Their property values have plummeted, and they cannot sell or refinance their homes. In the wake of years of inaction followed by this latest abrupt and emergency demolition plan, residents fear for their health and safety, and they are left to wonder whether the high incidents of respiratory issues, kidney disorders, cancer, asthma, and learning disabilities that occur frequently in their community were caused by lead and arsenic poisoning or other contaminants endemic to the Site. That uncertainty alone inflicts a special form of trauma.

In addition to failing to inform residents of basic dangers and improperly omitting an entire residential section of the Site from the remediation plan, EPA has failed to follow both the law and the basic clean-up protocols contained in its own handbooks and guidance for Superfund sites. For example, it did not assess interior or exterior lead-based paint issues, test or examine indoor dust, test drinking water, or examine the actual blood lead levels of the residents. EPA omitted from its evaluation obvious sources of aerial contamination and ignored that much of the area contained heavily contaminated fill material. It also failed to evaluate the presence of dangerous contaminants other than lead and arsenic. The result has been an ineffective and haphazard cleanup plan that significantly impacts Applicants' property interests and endangers their health.

EPA has very recently begun to take additional actions that may address some of these issues—but not in any formal way or with any binding commitments. Given what has, and more importantly what has not, transpired in the last seven years, and in order to protect residents' interests adequately, Applicants wish to exercise their statutory right to participate in the legal process. Specifically, Applicants seek to compel EPA to perform its obligations under CERCLA, including:

- 1) Ensuring that the remediation plan adequately protects human health and the environment and complies with all applicable federal and state laws;
- 2) Ensuring that the remediation plan covers the entire residential area affected by contamination, as originally contemplated by the ROD;
- 3) Ensuring that EPA adequately protects residents from hazardous exposure during and after remediation activities; and
- 4) Ensuring that the residents remain informed of and can provide input about the remediation plans.

The need for Applicants' intervention cannot reasonably be disputed under these circumstances.

I. BACKGROUND

A. The USS Lead Superfund Site

The environmental history of East Chicago, and the Site in particular, is critical to understanding just how desperate this situation has become. EPA considers all of East Chicago an "environmental justice community" because: (1) most residents have incomes well below the state median income; (2) almost all of the residents are people of color; and (3) the area is burdened by significant environmental challenges. (Record of Decision in U.S. Smelter and Lead Refinery, Inc. Superfund Site, Operable Unit 1 (2012) ("ROD"), attached hereto as Exhibit B, at 15). The densely populated neighborhood at issue in this case has experienced decades of toxic contamination. Beginning in the 1900s and continuing until the last facility closed in 1985, lead smelting and refining and other manufacturing processes left a legacy of lead, arsenic, and other toxic contamination that remains today. The facilities included an Anaconda Copper Company lead refinery (subsequently operated by Defendant Atlantic Richfield Company), a pesticide lead arsenate manufacturing facility owned and operated by Defendant DuPont, a U.S. Smelter and Lead, Inc. ("USS Lead") refinery, an Eagle-Picher Company white lead plant, and an International Lead Refining Company metal-refining facility. (*Id.* at 7–9, 15.)

As these facilities operated, the residential area of what is now the USS Lead Superfund Site rapidly developed. Many of the residences were built by the 1930s, and the majority of residences, including Applicants' homes, were completed by 1959. (*Id.* at 7.) In 1959, the City of East Chicago (the "City") built an elementary school, Carrie Gosch, just blocks north of the Anaconda facility, and for a time the City also used an Eagle-Pitcher facility as a school building. In 1972, the City built the West Calumet Housing Complex in the heart of the contaminated area—directly on top of the demolished Anaconda and International Lead Refining Company facilities. (*Id.*) This location decision was not accidental. In 1966, the Director of the

ECHA admitted in the public record that in order to avoid demolition of current buildings, the public housing was purposefully placed "in vacant areas surrounded by industries, and *undesirable* residential areas", using the term "undesirable" to refer to areas populated predominately by African-Americans and Hispanics/Latinos. *See* Housing Discrimination Complaint at 2, *O'Berry et al. v. East Chicago Housing Authority* (filed Aug. 29, 2016), attached hereto as Exhibit C (emphasis added).

The facilities wreaked environmental havoc on the area. For example, USS Lead did nothing to prevent lead-containing dust from its blast-furnace stack from escaping the baghouse capture system and blowing into the nearby residential area. (ROD, Ex. B, at 8.) USS Lead also stockpiled blast-furnace slag and then, once a year, spread the stockpile over a 21-acre wetland adjoining the facility—which was also adjacent to residential neighborhoods. (*Id.*) USS Lead and the other companies responsible for this contamination not only violated environmental laws in their operations (Human Health Risk Assessment for US Smelter and Lead Refinery (USS Lead) Superfund Site ("HHRA"), attached hereto as Exhibit D, at 2),² but also completely disregarded the health of the community.

B. EPA's Sporadic Testing and Failure to Act

From 1985 through 1998, EPA and other governmental agencies engaged in periodic and sporadic testing of certain residential properties on the USS Lead Superfund Site. Despite evidence of significant contamination, EPA failed to take any systematic action either to inform residents of the danger or remediate the problem.

In 1985, EPA testing at residential properties north of the Site indicated high levels of lead contamination. (HHRA, Ex. D, at 4.) The same year, U.S. Representative Peter Visclosky

² Applicants have attached the public, redacted version of the HHRA here.

wrote a letter to EPA requesting that EPA initiate a cleanup of the USS Lead facility and the surrounding area because of the lead contamination, citing communications from the Indiana State Board of Health to EPA on the same topic.³ To the best of Applicants' knowledge, no one notified the residents of these facts or took any steps to remediate the properties at that time.

Seven years later, in 1992, EPA first proposed adding this area to Superfund's National Priorities List. Instead of affirming that proposal, EPA allowed USS Lead (through its parent company) to remediate its facility under the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, *et seq.*, supervised by the Indiana Department of Environmental Management ("IDEM"). USS Lead conducted a limited, facility-only clean-up that did not address the contamination present on the adjacent residential properties.

Five years after the first proposal of Superfund status, in 1997, IDEM realized that the City was building a brand new Carrie Gosch Elementary School on the contaminated property. It then tested and confirmed contamination at the construction site. In 1998, the Indiana State Department of Health prepared an exposure investigation in the residential area, recommending: (a) further investigation into the properties and homes of the residents with elevated blood lead levels; and (b) remediation of the former Anaconda site (and noted that remediation was scheduled by IDEM).⁴ To the best of Applicants' knowledge, neither IDEM nor EPA took further action at the Site at that time.

Six years later, in 2003, EPA sampled 83 residential properties on the Site for lead. (HHRA, Ex. D, at 3.) Soil at 43 of the 83 locations sampled exceeded EPA's 400 parts per

³ See Sarah Reese, *History of the USS Lead Superfund Site in E.C.*, NWI Times (Sept. 4, 2016), http://www.nwitimes.com/history-of-the-uss-lead-superfund-site-in-e-c/article_eb369585-9e14-5a88-98c0-74c0fbaba5ea.html.

⁴ Indiana State Dep't of Health & U.S. Dep't of Health & Human Servs., Agency for Toxic Substances & Disease Registry, Div. of Health Assessment & Consultation, Exposure Investigation for U.S. Smelter Refinery Incorporated 6 (1998), *available at* http://bloximages.chicago2.vip.townnews.com/nwitimes.com/content/tncms/assets/v3/editorial/7/35/73542efa-b012-53f5-8573_a7a6071a58b2/57c88055ae96a.pdf.

million (ppm) "hazard" level for lead in residential areas.⁵ (*Id.*) However, to the best of Applicants' knowledge, EPA still did *nothing* in response to that sampling—it did not share the data with the residents whose property was tested, it did not warn residents that their soil was contaminated, it did not conduct any remediation of the affected properties, and it did not take any further action against USS Lead or the other companies responsible for the contamination. Instead, EPA waited *another three years*—until April, 2006—before conducting limited follow-up sampling of 14 of the 43 affected properties. (ROD, Ex. B, at 8; HHRA, Ex. D, at 3.)

That additional sampling revealed even worse contamination: on at least 12 of the 14 tested properties, contamination levels exceeded 1,200 ppm, the regulatory removal action level—or "emergency" level—for lead. Surface soil lead concentrations of over 1,200 ppm pose "an imminent and substantial threat to human health." (ROD, Ex. B, at 8.) EPA thus conducted a "time-critical" cleanup of 13 residential properties in 2008. (HHRA, Ex. D, at 3.) However, despite finding a number of properties that posed an imminent and substantial threat to human health, EPA did not expand testing to gauge the full extent of the risk to the residents in the area.

After that limited clean-up, and more than two years later, in September 2008, EPA finally evaluated the USS Lead Site under the Hazard Ranking System and referred the area to the NPL—in total, *more than 15 years* after it first proposed doing so. (*Id.*) The results of the evaluation confirmed that the Site surpassed the requisite hazard level for the NPL designation, and it was thus added in April 2009. (*Id.*)

⁵ The 400 ppm "hazard" standard has been derived from EPA modeling that indicates that exposure to 400 ppm lead in soil translates to 10 microliters per deciliter ("µL/dL") of lead in the blood, which was previously the CDC "actionable" blood lead level. Note that the Center for Disease Control has modified the actionable level of action to 5 µL/dL and EPA is currently re-evaluating the 10 µL/dL standard as well. *See* Dana Stalcup, Office of Superfund Remediation & Technology Innovation (OSRTI) Lead Policy (2016), attached hereto as Exhibit E.

Notably, the contamination likely extends beyond the boundaries of the defined Site—there is, for example, an abandoned lead smelter located directly across the street from the north boundary the residential Site. Further, the East Chicago Urban Enterprise Academy, a public elementary school, sits just across the street from highly contaminated properties, but, to the best of Applicants' knowledge, EPA has never tested that property to determine whether children are being exposed to contaminated soil every day they go to school.

C. The Remedial Investigation and Remediation Selection Process

Once a site is added to the NPL, EPA must undertake a multistep process designed to evaluate the contamination and develop a remediation plan that "assures protection of human health and the environment." 42 U.S.C. § 9621(d)(1). EPA conducts a two-part process, including (1) a Remedial Investigation and (2) a Feasibility Study (together, the "RI/FS"). The Remedial Investigation includes an extensive sampling program to define the nature and extent of contamination. The Feasibility Study develops and evaluates various remediation alternatives. EPA incorporates the results of the RI/FS into its selection and explanation of its chosen remediation plan in the ROD. The entire remediation process is proscribed by EPA regulations and guidance documents, including the Superfund Lead-Contaminated Residential Sites Handbook (2003) ("Residential Lead Handbook"), attached hereto as Exhibit F.

The process must include two major health assessments: a Human Health Risk Assessment, prepared by an EPA contractor, and a Public Health Assessment conducted by the Agency for Toxic Substances and Disease Registry ("ATSDR"). The Human Health Risk Assessment analyzes the "contaminants of concern" based on actual samples taken from the residential properties, evaluates risk based on current and future uses of the site, and examines the pathways of exposure to these contaminants, while ATSDR evaluates whether the public is exposed to hazardous substances and whether that exposure is harmful. The soundness of the

final remediation plan, which is supposed to protect human health, thus depend in large part on the validity of these two health assessments. At the same time, both health assessments rely on data provided by EPA, including sampling performed during the Remedial Investigation.

1. The ATSDR Report

ATSDR's January 27, 2011 Public Health Assessment for U.S. Smelter and Lead Refinery, Inc. ("ATSDR Report") concluded that "[b]reathing the air, drinking tap water or playing in soil in neighborhoods near the USS Lead Site is not expected to harm people's health." (ATSDR Report, attached hereto as Exhibit G, at 2.) This conclusion was absolutely wrong.⁶ The report assumed that "nearly 100%" of children living in East Chicago had been tested for elevated blood lead levels—leading ATSDR to conclude that the blood lead levels of children in the area were declining such that "they are no longer exposed to lead from any source." (*Id.* at 2, 7, 16) State data, however, shows that the assumptions underlying ATSDR's conclusions are false. Since 2005, the annual rate of blood lead testing among children in East Chicago ranged from only 5% to 20%.⁷ However, from 2005 to 2015, nearly 22 percent of children tested in the census tract that includes the USS Lead Site showed elevated blood lead levels.⁸ Children living in that census tract were more than *twice* as likely to have elevated blood lead levels than children living in other areas of East Chicago. Neither EPA nor ATSDR bothered to assess the actual blood lead levels of the children living on the Superfund Site, as

⁶ As recently detailed by Reuters, with input from Dr. Helen Binns, a pediatrician at Lurie Children's Hospital in Chicago and professor at Northwestern University's medical school, ATSDR based its findings on flawed and incomplete data. See Joshua Schneyer & M.B. Pell, *Special Report: Flawed CDC Report Left Indiana Children Vulnerable to Lead Poisoning*, Reuters, Sept. 28, 2016, available at <http://www.reuters.com/article/us-usa-pollution-report-specialreport-idUSKCN11Y1BH>.

⁷ The underlying data was provided to Reuters by the Indiana Department of Health, and Reuters provided it to Applicants. Applicants can make it available to the Court upon request.

⁸ Out of 734 children tested between 2005 and 2015, 160 children had elevated blood lead levels.

recommended by the Residential Lead Handbook (Ex. F, at 9-10, 15-16), and instead relied solely on the failed efforts of others when drawing their conclusions.

2. The Remedial Investigation and Human Health Risk Assessment

Here, the remediation selection process addressed only the residential area of the Site, which it named Operable Unit 1 or "OU1." (ROD, Ex. B, at 4.) EPA indicated that it would develop a RI/FS and ROD for the former USS Lead property, Operable Unit 2 ("OU2"), in the future. (*Id.* at 4–5.) EPA concluded that it needed to test 300 to 600 properties in OU1 in order to develop the remediation plan. (RAC II Region 5 Statement of Work for Remedial Investigation/Feasibility Study (RI/FS) USS Lead Superfund Site, Lake County, Indiana (2009), attached hereto as Exhibit H, at 7.) The actual Remedial Investigation sampled only 88 unique properties in OU1 for lead—about 7% of the 1,271 total properties—and based its risk analysis for the entire Site on this admittedly inadequate sample. (HHRA, Ex. D, at 6; ROD, Ex. B, at 8, 12.) Based on the HHRA and Remedial Investigation, it is unclear how many of the 88 properties were tested for arsenic and, at the properties that *were* tested, what method was used for that testing.

Testing revealed that 29 of the 88 properties needed "time-critical" remediation because their soil tested above the 1,200 ppm "emergency" level for lead. In fact, some properties tested as high as 27,100 ppm, which is more than *60 times* the hazard level. (ROD, Ex. B, at 17, 36.) From the sampling, EPA estimated that approximately 723 of the OU1 properties contained concentrations of lead and/or arsenic that posed a risk to human health. (*Id.* at 9.) To the best of Applicants' knowledge, EPA released the results of this testing only to some OU1 residents, and those letters included results for lead levels—but not arsenic levels. To date, EPA has cleaned

no more than 40 of the estimated 723 contaminated properties.⁹

Although EPA undertook lead testing and some arsenic testing, it analyzed only a very limited number of samples for other contaminants, despite legal requirements that it do so. In its Final Report, for example, EPA used flawed methodology to exclude polycyclic aromatic hydrocarbons ("PAHs"), an organic pollutant that presents a serious cancer risk, as a contaminant of concern. Instead of comparing the PAH sample results to the background PAH levels of the relevant East Chicago area, EPA instead compared the sample results to the PAH levels of the Chicago metropolitan area. (Remedial Investigation Report Final (2012) ("RI Final"), attached hereto as Exhibit I, at 190). Yet EPA *had* the site-specific information and EPA's own guidance document recommends using site-specific information *whenever possible*. (EPA & Office of Solid Waste & Emergency Response, OSWER Env'tl. Justice Task Force Draft Final Report Executive Summary (1994), attached hereto as Exhibit J, at 45.)

3. The ROD

After a public comment period, EPA published the ROD in November 2012, which relied on the fundamentally flawed Remedial Investigation and health assessments. For example, because EPA improperly ignored other contaminants of concern, the ROD considered remediation of only lead and arsenic contamination. (*See* ROD, Ex. B, at 17.) After comparing several remedial alternatives as required by CERCLA, EPA selected the option titled "Remedial Alternative 4A" for *the entire residential area of the USS Lead Site*. That option included excavating soil exceeding 400 ppm for lead and 26 ppm for arsenic, disposing the soil off-site, and replacing it with clean soil. (*See id.* at 8, 15, 36–37, 48–49.) Under "Assessment of Site," the ROD stated: "The response action selected in this [ROD] is necessary to protect the public

⁹ Because of the flawed sampling plan, this may be an underestimate of the number of contaminated properties.

health or welfare or the environment from actual or threatened releases of hazardous substances into the environment." (*Id.* at 4.) Nothing in the ROD indicated remediation of anything less than the entire OU1.

EPA's selected plan was not the community's first choice. During the public meetings on the draft ROD, the Mayor of East Chicago shared with EPA that the City wanted to perform demolition and redevelopment in the area, and accordingly wanted the more extensive cleanup as proposed under Remedial Alternative 4B. (Transcript, EPA Public Meeting, Proposed Cleanup Plan, US Lead and Smelter Site (July 25, 2012) ("2012 Public Meeting Transcript"), attached hereto as Exhibit K, at 32:17–35:12.) At that time, EPA explained that such demolition and redevelopment required remediation that was not economically feasible. Thus, the prospective demolition and redevelopment were knowingly and consciously omitted from the ROD, which stated: "[t]he land use of the properties will remain unchanged, and the Selected Remedy will allow for the continued residential use of impacted yards." (ROD, Ex. B, at 49.) EPA's selection of a less costly and less protective plan limited the City's ability to redevelop the land or to undertake needed repairs of streets and sewers, because doing so would require this more extensive cleanup. Now, suddenly, EPA has decided to consider the more extensive cleanup that it previously rejected as too expensive—but only for the limited area where the Public Housing sits. EPA has not yet sought any amendment to the ROD and has not explained why this more extensive cleanup should not be expanded to the Site's other contaminated residential areas. By ignoring the other residential areas, the selected remedy—even with the newly proposed revisions—fails to protect Applicants' health, safety, and property values.

D. The Consent Decree

A CERCLA Consent Decree must implement the remediation plan selected in the ROD; EPA may not change the plan in any significant way while negotiating the Consent Decree

without first publishing an explanation of the differences. 40 C.F.R. § 300.435(c)(2)(i). To the extent that the changes *fundamentally* alter the selected remedy with respect to scope, performance, or cost, EPA must propose an amendment to the ROD. 40 C.F.R. § 300.435(c)(2)(ii). As the regulations make clear: "[I]f the remedial action or enforcement action taken, or the settlement or consent decree entered into, differs significantly from the remedy selected in the ROD with respect to scope, performance, or cost," the lead agency *shall* either:

(i) **Publish an explanation of significant differences when the differences** in the remedial or enforcement action, settlement, or consent decree **significantly change but do not fundamentally alter** the remedy selected in the ROD with respect to scope, performance, or cost. . . . or;

(ii) **Propose an amendment to the ROD if the differences** in the remedial or enforcement action, settlement, or consent decree **fundamentally alter the basic features of the selected remedy with respect to scope**, performance, or cost.

40 C.F.R. § 300.435(c)(2) (emphasis added); *see also* 42 U.S.C. § 9617(b) ("Notice of the final remedial action plan adopted shall be published and the plan shall be made available to the public before commencement of any remedial action. Such final plan shall be accompanied by a discussion of any significant changes (and the reasons for such changes) in the proposed plan and a response to each of the significant comments, criticisms, and new data submitted in written or oral presentations under subsection (a) of this section.").

However, here, the remediation plan outlined in the Consent Decree, which this Court entered on October 28, 2014 (Dkt. No. 8), differed from the remediation plan selected by the ROD in at least one fundamental respect: it excluded an entire residential section of the Site from the remediation, "fundamentally alter[ing] the basic features of the elected remedy" of the ROD "with respect to scope." (Consent Decree, Dkt. Nos. 2-2, 2-3, apps. B, D.) Rather than

planning for the remediation of OU1 in its entirety, the Consent Decree split up OU1 into three "zones." (*Id.*)¹⁰ Zone 1 includes the Public Housing, operated by the ECHA, Carrie Gosch Elementary School, and Goodman Park. Zones 2 and 3 are residential areas. The remediation plan in the Consent Decree included only Zones 1 and 3 and omitted Zone 2 entirely. (*See id.* at 12; *see also id.* at Ex. B at B-1.) EPA knew that there was widespread contamination throughout Zone 2 such that leaving Zone 2 out of the remediation plan would certainly expose residents to health risks. Of the 88 residential properties tested during the Remedial Investigation, 31 of the properties tested were within Zone 2. Twenty-five of the properties tested in Zone 2 exceeded 400 ppm lead, which created an unacceptable risk for human health at those properties. (*See* RI Final, Ex. I, at Figs. 5-1, 5-2, 5-3; *id.* at Ex. A.)

To the best of Applicants' knowledge, EPA *never* explained why it omitted Zone 2. It simply published the proposed Consent Decree in the Federal Register, which is not even adequate notice for entering a Consent Decree that *properly* implements a remediation plan selected by a ROD. *See* 42 U.S.C. § 9617 (publication of a final judgment has to be, at minimum, publication in a major local newspaper). Suffice to say, most citizens do not regularly read the Federal Register.

During the October 28, 2014 telephonic status hearing, the Court noticed that the Consent Decree only covered Zones 1 and 3 and asked the attorney for the United States, Annette Lang, "What's gonna happen to zone two?" (October 28, 2014 Status Hearing Transcript, Dkt. No. 12, attached hereto as Exhibit M, at 4:2–3.) Ms. Lang responded:

¹⁰ An April 2012 document from SulTRAC, an EPA contractor, shows OU1 split up into Zones 1, 2, and 3 (SulTRAC, Residential Operational Unit 1 (OU1) – 3 Zones (2012), attached hereto as Exhibit L); however, neither the June 2009 Remedial Investigation Statement of Work, August 2009 Remedial Investigation Work Plan, June 2012 Remedial Investigation Report Final, or November 2012 ROD mention dividing OU1 up into zones.

Zone two is slated for remediation in the second phase of this particular cleanup as EPA often does, it is taking a phased approach to this cleanup; so it decided to start with what we call zone one and zone three and to commence as soon as possible on that and then undertake further work in the development of access of the case involving zone two.

(*Id.* at 4:5–12.) The Court responded, "I see. So zone two wasn't even part of the complaint in this case, is that right?" (*Id.* at 4:19–20.) Ms. Lang responded, "No. No it was not, Your Honor. That's correct." (*Id.* at 4:21–22.)

Ms. Lang's misleading response to this Court misrepresented EPA's process and omitted critical information. Ms. Lang did not explain to the Court that the remediation plan outlined in the ROD, which EPA was obligated to implement, covered the remediation of *all* residents in OU1, including Zone 2. At no point during the RI/FS and in no place in the ROD did EPA state that remediation of the Site would be conducted in phases or that any zone of OU1 would not be included in the Proposed Plan. Rather, the Complaint was filed *concurrently* with, and thus conformed to, the Consent Decree—and EPA never explained to this Court, residents or the public more generally that the remediation plan outlined in the Complaint fell short of the remediation plan outlined in the ROD.

E. Remediation of the USS Lead Site

Not only did EPA select a flawed remediation plan that left out an entire residential area of the USS Lead Site, it also failed to properly execute that selected plan. In May 2015, after the Consent Decree was entered, EPA began testing the soil in Zone 1 in accordance with the approved Remedial Design testing plan. However, the Remedial Design testing plan indicates a reliance, for the majority of the properties, on X-ray Fluorescence ("XRF") testing,¹¹ which—

¹¹ SulTRAC, Draft Quality Assurance Project Plan for U.S. Smelter and Lead Residential Area Superfund Site OU1 Remedial Design, East Chicago, Lake County, IN, attached hereto as Exhibit N, at B-23 (2014).

according to EPA's own documents—is not a scientifically accurate or appropriate way to test for arsenic particularly when arsenic and lead are present together.¹²

Further, even after testing revealed that many of the properties were contaminated above 400 ppm, EPA did not release the results of the soil tests to residents or inform residents that their soil contained dangerous levels of lead. Instead, with no explanation, EPA waited until May 24, 2016 to release the data. This was *24 years* after EPA first recommended the USS Lead Site be placed on the NPL and still *7 years* after it finally was placed on the list.

After receiving the Zone 1 test results, the Mayor of the City of East Chicago announced at the end of July 2016 that Zone 1 Public Housing residents would be relocated temporarily, and then one week later, the Mayor and the East Chicago Housing Authority announced that, because of the high levels of lead and arsenic contamination, the Public Housing would be demolished and residents would be provided Section 8 housing vouchers. (*See* Letter from Mayor Copeland to West Calumet Housing Complex Residents (July 2016), attached hereto as Exhibit Q; East Chicago Housing Authority Public Notice of Disposition and Demolition for Unsafe Environmental Issues (July 27, 2016), attached hereto as Exhibit R.)

Based on Zone 1's changed use, EPA *again* fundamentally changed the remediation plan for the USS Lead Site without notifying the public or amending the ROD. The Government explained in a Status Report filed in this case on September 2, 2016:

EPA is in the process of reexamining the remedy selected for the WCHC in the 2012 ROD and, during that reexamination, is not proceeding with full implementation of the remedy in Zone 1. This remedy reexamination has been prompted and may be

¹² See EPA Region 4, Science and Ecosystem and Support Division, Field X-Ray Fluorescence Measurement 6 (2015), attached hereto as Exhibit O (explaining that when lead and arsenic are present in the same soil, XRF would not be an appropriate way to test for arsenic); Dennis J. Kalnicky & Raj Singhvi, *Portable XRF Analysis of Environmental Samples*, J. Hazardous Materials 83, 93–122 (2001), attached hereto as Exhibit P.

affected by ECHA/HUD efforts to relocate WCHC residents and potential future land use changes.

(Sept. 2, 2016 Status Report, Dkt. No. 11, attached hereto as Exhibit S, at 4.).

As news spread regarding the pending demolition of the Public Housing, the impacted community learned—for the first time in any meaningful way—about EPA's 2014 decision to eliminate Zone 2 from the cleanup. And only after Zone 1's extraordinarily high test results became public, and with the spotlight on its actions, did EPA finally began testing Zone 2 properties in earnest.

EPA's plans for the current cleanup raise many other problems. EPA has consistently minimized or ignored public health issues at the Site. As one example, despite knowing about extremely high levels of soil contamination for years, EPA waited until late July 2016 to place signage in Zone 1 warning residents to avoid playing in contaminated soil. EPA still has not placed warning signs on Zone 2 or Zone 3 properties despite soil test results showing contamination levels above both the hazardous and emergency removal thresholds.

In addition, only recently, and in response to public pressure, has EPA indicated that it will investigate water seepage in basements in Zones 2 and 3, despite knowing since 2004 that arsenic-contaminated groundwater from DuPont's adjacent property was flowing towards Zone 3 and is a likely the source of water in basements during flood events.¹³ Indeed, to the best of Applicants' knowledge, EPA has not taken action to ensure that the neighboring DuPont property or the contaminated OU2 will not re-contaminate OU1, despite the fact that recent Indiana

¹³ See Corporate Remediation Group, Draft Human Health Baseline Risk Assessment, DuPont East Chicago 17, 20 (2004), attached hereto as Exhibit T (discussing exposure pathway of groundwater flow to basements in what is now deemed Zone 3). When responding to EPA comments regarding the draft Phase II RFI Report on the DuPont East Chicago Facility, DuPont explained in Comment 2, "DuPont will revise Figure 5 to reflect off-site resident groundwater direct contact as a potentially complete exposure pathway. However, since Riley Park residential exposures would be limited to infrequent physical contact with basement sump water, further quantitative evaluation of this pathway is not necessary." Letter from Hugh J. Campbell, Jr. DuPont Corporate Remediation Group, Business Team Leader to Brian P. Freeman, U.S. EPA, Region V (Sept. 2, 2004), attached hereto as Exhibit U,

Department of Environmental Management records indicate that the USS Lead facility has exceeded limits for arsenic, fluoride, and cadmium,¹⁴ which may ultimately mean that contamination of the neighboring OU1 is ongoing.

F. Intervenor

Sara Jimenez, Mauro Jimenez, Carmen Garza, Gabriela Garza, Andrea Jurado, and Ron Adams are residents who own property or have an interest in property in Zones 2 and 3. Calumet Lives Matter and We the People of East Chicago are community groups that represent the interests of residents in Zones 1, 2, and 3.

1. Sara and Mauro Jimenez

In 2000, Sara and Mauro Jimenez bought and moved into their Zone 3 home at 4917 Euclid Avenue, East Chicago, Indiana 46312. Mauro is retired, and Sara runs a commercial janitorial cleaning company, SLP Commercial & Janitorial Services.

When they bought their home from Mr. William Turner, the Jimenezes received no disclosure of environmental contamination—indeed, there was no reason for Mr. Turner to have known that the property was contaminated, and the area had not yet been declared a Superfund Site. In or around 2011, a representative from EPA knocked on the Jimenezes' door unannounced and asked for permission to test the soil around their home. EPA did not explain the nature of the testing. EPA promised to send the results of the tests to the Jimenezes, but no results were sent at that time. The Jimenezes assumed everything was fine.

Five years later, in August 2016, the news of the contamination at the USS Lead Site broke, and the Jimenezes realized for the first time why the EPA had tested their property.

¹⁴ See USS Lead Refinery, Inc., First Biannual 2015 Post Closure Monitoring Report, Section 4.0 (Sept. 20, 2015), available at https://ecm.idem.in.gov/cs/idcplg?IdcService=GET_FILE&dID=80138428&dDocName=80138528&mRendition=web&allowInterrupt=1&noSaveAs=1&fileName=80138528.pdf.

Mauro contacted EPA that month and told them that he never received the test results. At that time, EPA refused to provide Mauro with any additional information. The Jimenezes received a letter dated September 14, 2016 from EPA stating, "As you may recall, soil from your property was tested *recently* for lead and arsenic". (Letter from Timothy Drexler, EPA Remedial Project Manager, to Mauro Jimenez (Sept. 14, 2015), attached here to as Exhibit V) (emphasis added). That statement was false; their property had not been recently tested. Rather, the letter finally disclosed the results of the soil testing that had been performed *five years* earlier, and which revealed that the Jimenezes' soil was contaminated:

Depth	Front Yard – Lead (mg/kg)	Front Yard – Arsenic (mg/kg)	Back Yard – Lead (mg/kg)	Back Yard – Arsenic (mg/kg)
0-6 inches	286	18	438	34
6-12 inches	1673	112	1544	139
12-18 inches	929	46	1597	56
18-24 inches	1504	83	873	39
24-30 inches	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)

Before they found out about the contamination, the Jimenezes were planning on selling their home. They had secured a buyer through a family contact and agreed on a price between \$80,000 and \$85,000 and were finalizing the details. The prospective purchasers had small children and the contamination issues have put the sale on hold.

Further, Sara has a genetic kidney disease and needs a kidney transplant. She is now concerned that lead and arsenic exposure will complicate her kidney transplant. After discussing the contamination with one of her physicians, the physician told her that she needed to move out of her home immediately.

2. Carmen Garza, Gabriela Garza, and Andrea Jurado

Carmen Garza and her husband Rafael, deceased, bought her Zone 3 home at 4927 Euclid Avenue, East Chicago, Indiana 46312 in 1975. Carmen came to the United States in 1968, and she lived in the Harbor neighborhood of East Chicago before moving to her current home. Carmen has two daughters, Gabriela Garza and Andrea Jurado, who grew up in the home and who have an interest in the property in the event of Carmen's death. Carmen's granddaughter, Abigail Jurado, also lived in the home until she was 6 months old.

In or around 2010, a representative from EPA knocked on the Garzas' door unannounced and asked for permission to test the soil around their home. EPA told Carmen that they were testing for contamination, but it did not specify from where the contamination came or for what kind of contamination it was testing. EPA never sent Carmen the results from that testing. Carmen received a letter from EPA dated September 14, 2016 stating, "As you may recall, soil from your property was tested recently for lead and arsenic." That statement was false; their property had not been recently tested. Rather, the letter finally disclosed the results of the soil testing that had been performed *six years* earlier, and which revealed that Carmen's soil was contaminated:

Depth	Front Yard – Lead (mg/kg)	Front Yard – Arsenic (mg/kg)	Back Yard – Lead (mg/kg)	Back Yard – Arsenic (mg/kg)
0-6 inches	360	19	946	126
6-12 inches	240	15	2588	167
12-18 inches	107	17	1600	152
18-24 inches	314	23	1032	96
24-30 inches	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)

On or around October 12, 2016, an EPA representative came to Carmen's home and told Carmen that her home would be remediated the week of October 24, 2016. Carmen signed a consent form for EPA to conduct the remediation at that time. During that week, an EPA surveyor came by the house, and when Carmen asked him when the remediation would start, he told her that EPA was behind schedule due to rain, and he could not give her a specific date when her remediation would be completed. EPA has not given Carmen updated information about remediation. Carmen, Gabriela, and Andrea are concerned that, given the current remediation plan, Carmen's home will not be safe to live in even after it is remediated.

3. Ron Adams

Ron Adams owns two properties in Zone 2, one at 4735 McCook Avenue, East Chicago, Indiana 46312 ("4635 McCook"), and one at 5019 Alexander Ave, East Chicago, Indiana, 46312 ("5019 Alexander"). Ron's property at 5019 Alexander was tested on or around August, 2016. On or around September 12, 2016, an EPA representative called Ron and told him that his property was contaminated and that EPA would follow up with him. Ron received a letter from EPA dated September 14, 2016 detailing the extent of the contamination:

Depth	Front Yard – Lead (mg/kg)	Front Yard – Arsenic (mg/kg)	Back Yard – Lead (mg/kg)	Back Yard – Arsenic (mg/kg)
0-6 inches	612	23.8	981	111
6-12 inches	377	17.6	489	74.8
12-18 inches	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)
18-24 inches	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)
24-30 inches	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)	Native Sand (NS)

After receiving this letter, Ron called EPA to question it about how it was going to address the contamination on his property, but he was unable to reach anyone and has yet to

receive a response. Ron plans to sell the 5019 Alexander property and worries that he will be unable to do so due to the contamination.

Ron's property at 4735 McCook was tested on or around September 2016. Ron has not yet received any information regarding the results of that testing. When he asked the EPA at a community meeting about the results, he was told that it would take 6 to 8 weeks to receive the results.

4. We the People for East Chicago

We the People For East Chicago (WTPFEC) is a community organization whose members are property owners and other residents and concerned citizens of East Chicago. WTPFEC is a non-profit corporation. People most affected by a problem are in the best position to help determine the solution. It is towards this goal that WTPFEC is working for the citizens of East Chicago to educate, to help them become aware of the various needs for environmental and social justice, and to assist them in their fight to succeed in making the necessary changes in their community to improve the overall quality of life. This includes assisting them in making a wider audience aware of the needs for change and to require those accountable to make the necessary changes. WTPFEC members primarily live in Zones 2 and 3. WTPFEC has undertaken extensive canvassing of all three zones to ensure that their neighbors learn about the contamination, the health risks associated with the contamination, EPA meetings, and Community Advisory Group meetings.

5. Calumet Lives Matter

Calumet Lives Matter also seeks to intervene on behalf of itself and its members. Calumet Lives Matter is a community organization comprised of residents of OU1. Calumet Lives Matter was formed by residents, including residents of the West Calumet Housing Complex, of the Calumet neighborhood in East Chicago, Indiana and their allies. The purpose of

Calumet Lives Matter is to bring residents in OU1 together and connect them to the educational, social, economic and legal resources needed to address and defend their rights as they navigate tremendous disruptions and harm to their lives due to living in the contaminated Superfund Site. Calumet Lives Matter has organized around issues of housing, health, education, resident case management, economic and environmental risks. Calumet Lives Matter has committed resources and hundreds of hours of time to addressing the needs of residents and to sharing information about public meetings, blood testing, and other updates.

ARGUMENT

In investigating, selecting, and executing the remediation plan at issue in this case, the Government has violated its statutory duties and simply ignored Applicants' interests. First, the selected remediation plan was based on health assessments that relied on fundamentally flawed data and never analyzed serious contaminants of concern. Then, not only did EPA entirely alter the scope of the remediation plan—*twice*—outside of its statutory obligations, but also the remediation plan outlined in the Consent Decree and the EPA's ad hoc response to the City of East Chicago's demolition announcement each undermine key assumptions made in the Remedial Investigation. Under 40 C.F.R. § 300.435(c)(2), these fundamental changes require EPA to amend the ROD.

Applicants are thus entitled to intervene as a matter of right under both CERCLA, 42 U.S.C. § 9613(i), and Rule 24(a)(2) in order to compel EPA to fulfill its obligations under CERCLA and other applicable laws and regulations. In the alternative, Applicants request that this Court grant them permissive intervention under Rule 24(b)(1).

I. APPLICANTS ARE ENTITLED TO INTERVENE AS A MATTER OF RIGHT

Applicants have significant health and property interests that are currently threatened by this litigation, and the existing parties are not adequately representing these interests. Applicants therefore are entitled to intervene as a matter of right. CERCLA explicitly provides:

[A]ny person may intervene as a matter of right when such person claims an interest relating to the subject of the action and is so situated that the disposition of the action may, as a practical matter, impair or impede the person's ability to protect that interest, unless the President or the State shows that the person's interest is adequately represented by existing parties.

42 U.S.C. § 9613(i). Under Rule 24(a)(2), anyone who files a timely application:

shall be permitted to intervene in an action: . . . when the applicant claims an interest relating to the property or transaction which is the subject of the action and the applicant is so situated that the disposition of the action may as a practical matter impair or impede the applicant's ability to protect that interest, unless the applicant's interest is adequately represented by existing parties.

An applicant may thus intervene as a matter of right under either § 113(i) or Rule 24(a)(2) where: (1) the application is timely; (2) the applicant has an "interest" in the property or transaction that is the subject of the action; (3) disposition of the action may impede or impair the applicant's ability to protect that interest; and (4) no existing party adequately represents the applicant's interest. *Int'l Paper Co. v. City of Tomah*, No. 00-C-539-C, 2000 WL 34230089, at *2 (W.D. Wis. Nov. 30, 2000) (citing *Sec. Ins. Co. of Hartford v. Schipporeit*, 69 F.3d 1377, 1380 (7th Cir.1995)).

Notably, under § 113(i), the *Government*—not Applicants—bears the burden of showing that the intervening applicants' interests are adequately represented by the existing parties. *See United States v. Aerojet Gen. Corp.*, 606 F.3d 1142, 1149 (9th Cir. 2010); *United States v. Union Elec. Co.*, 64 F.3d 1152, 1157 (8th Cir. 1995) ("[CERCLA] places the burden on the President or the State to show that the potential intervenor's interest is adequately represented by existing

parties."). In general, Courts interpret intervention requirements broadly in favor of intervention. *Miami Tribe of Okla. v. Walden*, 206 F.R.D. 238, 241 (S.D. Ill. 2001) ("Courts should construe Rule 24(a)(2) liberally and should resolve doubts in favor of allowing intervention."); *see also Aerojet*, 606 F.3d at 1148 ("In determining whether intervention is appropriate, courts are guided primarily by practical and equitable considerations, and the requirements for intervention are broadly interpreted in favor of intervention.").

Here, Applicants clearly meet the four factors for intervention. First, they have significant and legally recognized interests in their property and health. Second, those interests are threatened by both the flawed ROD, and the fundamental, yet procedurally improper, changes that EPA made to that plan both in the Consent Decree and as announced in the September 2, 2016 Status Report. These changes required EPA to amend the ROD and follow the notice and comment procedures mandated by CERCLA, which it simply failed to do. Third, neither the Government nor Defendants are adequately representing Applicants' interests in this litigation. Finally, Applicants timely filed this Motion to Intervene after they learned of the threat to their interests.

A. Applicants Have Significant and Protectable Interests in Their Property and Health

In order to intervene in an action, an applicant's interest in the action must be a "direct, significant legally protectable one." *Uesugi Farms, Inc. v. Michael J. Navilio & Son, Inc.*, No. 15-CV-1724, 2015 WL 3962007, at *2 (N.D. Ill. June 25, 2015). Intervention in an action "requires only that the interest be 'related to' the property or transaction at issue". *Michigan v. U.S. Army Corps of Eng'rs*, No. 10-CV-4457, 2010 WL 3324698, at *3 (N.D. Ill. Aug. 20, 2010). Applicants here have significant, legally protected health and property interests related to the remediation of the Site.

Whether and how remediation of the Site is carried out directly affects Applicants' health interests. Regarding the addition of §113(i), the House Judiciary Committee report made clear that "a direct public health interest" in a CERCLA action is an interest that supports intervention:

Finally, the Committee amendment adds a new subsection 113[i] to CERCLA to provide that any person may intervene as a matter of right when that person claims a direct public health or environmental interest in the subject of a judicial action allowed under this section, and when the disposition of the action may impair or impede the person's ability to protect that interest.

United States v. Alcan Aluminum, Inc., 25 F.3d 1174, 1180 n.8 (3d Cir. 1994) (citing H.R. Rep. No. 253, 99th Cong., 1st Sess., pt. 3, at 24 (1985), reprinted in 1986 U.S.C.C.A.N. at 2835, 3047). In similar contexts, courts have allowed an applicant to intervene where the applicant's interest was based on protecting public health and safety. *See Michigan*, 2010 WL 3324698, at *4, *7. If the USS Lead Site is not properly remediated, Applicants face continued exposure to lead, arsenic, PAHs, and other contaminants, all of which can cause severe health effects.

Further, it is well-established that owners of property subject to remediation under CERCLA have an interest in the remediation action. *See City of Emeryville v. Robinson*, 621 F.3d 1251, 1260 (9th Cir. 2010) (affirming district court's ruling that local property owners could intervene in action to enforce CERCLA consent decree because at least one "faced the loss of substantial value of his property"); *City of Bangor v. Citizens Commc'ns Co. ("Bangor I")*, Civ. No. 02-183-B-S, 2007 WL 1557426, at *3 (D. Maine, May 25, 2007), *aff'd on other grounds*, *City of Bangor v. Citizens Commc'ns Co. ("Bangor II")*, 532 F.3d 70 (1st Cir. 2008) (where a state owned the property subject to CERCLA remediation, "there is no dispute that the State has an interest in the property that is the subject of the action" as required by Section 113(i)); *cf. Mille Lacs Band of Chippewa Indians v. Minnesota*, 989 F.2d 994, 997-98, 1001-02 (8th Cir. 1993) (concluding that landowners "easily" satisfied the intervention as of

right requirements because the litigation affected a Native American tribe's right to hunt, fish, and gather on the proposed intervenors' land and the outcome of the case also affected their property values). The Seventh Circuit has made clear that a property interest more than satisfies the interest requirement to intervene as a matter of right. *See Michigan*, 2010 WL 3324698, at *3 (citing *Reich v. ABC/York Estes Corp.*, 64 F.3d 316, 322 (7th Cir. 1995); *United States v. City of Chicago*, 870 F.2d 1256, 1260 (7th Cir.1989)) ("The Seventh Circuit has defined 'interest' as something more than a mere 'betting' interest, but less than an actual property right."). Moreover, the courts have made clear that potentially responsible parties who were not originally part of a CERCLA case may intervene in the case to protect their own liability. *See Aerojet*, 606 F.3d at 1142; *United States v. Albert Inv. Co., Inc.*, 585 F.3d 1386 (10th Cir. 2009); *United States v. Union Elec. Co.*, 64 F.3d 1152 (8th Cir. 1995). If courts allow responsible parties to intervene, then it surely must permit intervention of the very people whom CERCLA remediation is designed to protect. Indeed, people who are *liable* under CERCLA cannot possibly have greater intervention rights than the people whom CERCLA is supposed to *protect*.

B. Applicants' Ability to Protect Their Interests Has Been Impaired by This Action and Will Be Further Impeded if They Are Unable to Intervene

"[A] party has a sufficient interest for intervention purposes if it will suffer a practical impairment of its interests as a result of the pending litigation." *City of Emeryville*, 621 F.3d at 1259. The Consent Decree that the Parties have implemented in this case has clearly impaired Applicants' health and property interests and threatens to do further damage.

1. Applicants' health interests are threatened by this action

The selection and implementation of the remediation plan for the Site—and the changes that EPA made to the remediation plan between issuing the ROD and entering the Consent Decree—directly impact the public health and safety of Applicants and other residents living on

contaminated soil. The EPA explicitly stated that "[t]he response action selected in this [ROD]," which covered *all* of OUI—Zones 1, 2, and 3—"is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment." (ROD, Ex. B, at 4.) However, EPA then left Zone 2 entirely out of the response action and has barely begun to remediate Zone 3. Applicants live on properties that tested at hazard and emergency levels for lead and arsenic *five years ago*. Even a single exposure to lead can raise blood lead levels dangerously. Therefore, every day that their properties are not remediated is a day that they are exposed to significant health risks.

Further, while the Consent Decree calls for full remediation of Zone 3, the remediation plan nevertheless relies on the seriously flawed Remedial Investigation. The Remedial Investigation, undermined by unsound health assessments, not only set insufficient cleanup levels for arsenic and lead, but also failed to assess lead paint issues, indoor dust, or drinking water. EPA also failed to use a proper sampling process for the soil testing and to assess actual blood lead levels of the subject residents. All of these failures contradict the guidance in EPA's own Residential Lead Handbook. EPA also based remediation only on the risks posed by lead and arsenic, foreclosing remediation for other dangerous contaminants present at the USS Lead Site like PAHs.

The Consent Decree calls for abating arsenic levels down to 26 ppm, but that is an insufficient level given the substantial cumulative impacts faced by this community and is higher than what EPA has required at other sites in the region. At the Matthiessen & Hegeler Superfund site in Illinois, for example, EPA determined that 18 ppm is the proper level of arsenic abatement. (*See* EPA, Proposed Plan Public Meeting for the Matthiessen and Hegeler Zinc Company Superfund Site (2015), attached hereto as Exhibit W, at 40.) It is not fair, reasonable,

or adequate for EPA to expose these occupants to higher levels of arsenic than it has deemed safe in other locations. Indeed, under the current plan in East Chicago, homes that test under 26 ppm for arsenic and 400 ppm for lead will *never* be remediated, even if they test at arsenic levels considered dangerous at other Superfund sites. Similarly, residents whose properties do not surpass the hazard level for arsenic and lead may still surpass the hazard level for other contaminants of concern and never be remediated because EPA eliminated all other contaminants of concern without explanation or justification. Therefore, based on the current remediation plan, any resident whose property is not targeted for remediation still faces possible exposure to hazardous substances.

The health risks posed by the remediation plan outlined in the Consent Decree have now been compounded by the September 2, 2016 Status Report announcing the delay of remediation of Zone 1. The indefinite delay in remediation of this site increases the potential of further contamination to neighboring Zones 2 and 3, because rain or wind events could move the lead-contaminated soil between Zones. Furthermore, the Consent Decree was based on the assumption that Zone 1 would continue as residential property. If Zone 1's use is changed to, for example, industrial use, then the risks associated with living in Zone 2 and 3 could rise—because higher levels of contamination would be left in the ground than would have been the case under the existing plan—thereby requiring even further remedial action on Zone 2 and 3. *See* 42 U.S.C. § 9621(d)(1) ("Remedial actions selected under this section . . . shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released . . . which assures protection of human health and the environment.") Applicants' health and safety interests are directly related to, and threatened by, the changes to the remediation plan.

2. Applicants' existing property interests are threatened by this action

Environmental contamination undoubtedly affects property values negatively, which impairs property owners' interests. *See City of Emeryville*, 621 F.3d at 1259-60; *cf. Mille Lacs Band of Chippewa Indians*, 989 F.2d at 997. Indiana Code § 32-21-5-2 requires sellers of residential property in Indiana to complete "Seller's Residential Real Estate Sales Disclosure," and specially disclose any hazardous contamination on the property. Here, the Consent Decree's exclusion of Zone 2 from the remediation plan affects all property owners in Zone 2. Until they are remediated, Zone 2 properties are essentially worthless. Sara and Mauro Jimenez, for example, are currently unable to sell their home in Zone 3 because EPA has not yet begun to remediate their property. If and when EPA *does* remediate their property, the current remediation plan covers remediation only of arsenic and lead; Applicants, like all other residents whose properties are being remediated, have no guarantee that their land will actually be free from other contaminants.

C. Applicants' Interests Are Not Adequately Represented By The Existing Parties

Under CERCLA § 113(i), *the Government* bears the burden of showing that Applicants' interests are adequately represented by the existing Parties. Here, after years of delay in the face of known contamination, EPA failed to represent Applicants' interests throughout the remedy selection process. First, EPA selected a remedy based on flawed data that is simply not protective of Applicants' health or property interests. Then, EPA fundamentally changed the remediation plan *twice* without engaging the community throughout the process or providing the community adequate notice. Finally, EPA has also ignored environmental justice considerations, failing to apply best practices that it has implemented at other Superfund sites and failing to

evaluate the existing and likely future disproportionate burden placed on the impacted community—all in violation of its own policies and guidance.

1. EPA did not represent Applicants' interests during the remedy selection process

EPA's missteps at every step of the remediation selection process clearly show that EPA has not been representing Applicants' interests. Separate and apart from the fact that EPA delayed adding the USS Lead Site to the NPL in the first place, EPA utterly failed to develop a remediation plan that "assures protection of human health and the environment." 42 U.S.C. § 9621(d)(1); *see also* 40 C.F.R. § 300.430(a)(1)(i), (e)(9)(iii)(B). At the public hearing for the proposed cleanup plan, EPA explained that the remediation plan had to meet these threshold requirements. (Transcript of July 25, 2012 Public Meeting at 23.) Nevertheless, during the remedial investigation, EPA failed to conduct adequately the appropriate site-specific investigation—including evaluating a sufficient number of properties, assessing blood lead levels, drinking water, testing interior lead dust or testing for lead-based paint—and the HHRA relied on that flawed and incomplete data. EPA also employed faulty methodology to eliminate serious contaminants as contaminants of concern. The ATSDR Report also came to a false conclusion about the health risks at the Site. The remedy EPA selected in the ROD was a result of this series of missteps and does not ensure protection of health and the environment. Time and time again, EPA's actions have demonstrated that EPA has not represented Applicants' interests.

2. EPA has failed to provide statutorily-required notice and comment regarding the changes

The Consent Decree and September 2, 2016 Status Report further impair Applicants' interests because EPA did not afford the community proper notice or ability to comment on the remediation plan offered in either of those documents. The first of EPA's significant failures occurred during the 30-day notice for the Consent Decree when EPA did not provide a public

hearing or issue any fact sheets. Under 40 C.F.R. § 300.435(c)(2)(i), if the Consent Decree or remedial action differs significantly from the adopted Record of Decision (ROD), EPA is required to publish an explanation of the significant difference between the ROD and remedial actions. Here, EPA eliminated an entire zone from the remedial plan without notifying or explaining its decision to the public. EPA's conclusion that the elimination of Zone 2 from its cleanup plan is not a significant change requiring public comment is in opposition with EPA's own Superfund guidance documents. EPA's guidance documents identify significant changes as modifications that have "a significant effect on the scope" of a remedy, including changes that substantially alter the "physical area of response, remediation goals, or type and volume of waste to be addressed." (EPA, A Guide to Preparing Superfund Proposed Plans, Records of Decisions, and Other Remedy Selection Decision Documents (1999), attached hereto as Exhibit X, at 7-1.)

EPA failed to meet its notice obligations yet *again* when it filed the September 2, 2016 Status Report with no attempt at public notice. If the differences in remedial action "fundamentally alter the basic features of the selected remedy with respect to *scope*, performance, or cost," EPA is required to propose an amendment to the original ROD. 40 C.F.R. § 300.435(c)(2)(ii) (emphasis added). The indefinite delay of the remediation of Zone 1 is a fundamental alteration to the Consent Decree. The area represented roughly a third of the OU-1 portion of the Site, and almost half of the total area to be remediated.

3. Environmental justice considerations render the parties' representation of Applicants inadequate

EPA's failures regarding environmental justice considerations further underscore how EPA has not represented Applicants' interests. Beginning in 1994, when President Clinton issued Executive Order 12898, federal agencies have been obligated to make environmental

justice a part of their mission.¹⁵ EPA defines environmental justice as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."¹⁶ According to EPA, fair treatment means "no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies."¹⁷

Environmental justice issues are particularly important in the context of Superfund sites, which disproportionately impact low-income communities of color.¹⁸ EPA has recognized the need to consider environmental justice issues in the Superfund context, conducting environmental justice analyses of the remedial alternatives at other Superfund sites. For example, in analyzing the Lower Duwamish Waterway Superfund Site near Seattle, Washington, EPA "synthesize[d] evidence of and information on the background of the affected community, environmental and health burdens in the community in comparison to . . . provide a summary of known or identified environmental justice concerns".¹⁹ EPA also relied on the community's health concerns to recommend adjustments for each possible remedy to minimize the disproportionate burden on the environmental justice community.

Here, EPA had an obligation at the USS Lead Site to evaluate the unique vulnerability of the residents living in OU1: "When making decisions about a cleanup and planning its

¹⁵ Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Exec. Order No. 12898, 59 F.R. 7629 (Feb. 16, 1994). Each agency, including EPA, developed implementing policy and guidance. DOJ also issued guidance re enforcement in environmental justice cases.

¹⁶ *Environmental Justice*, EPA, <https://www.epa.gov/environmentaljustice>.

¹⁷ *Learn about Environmental Justice*, EPA, <https://www.epa.gov/environmentaljustice/learn-aboutenvironmental-justice> (last updated Mar. 29, 2016).

¹⁸ See United States Commission on Civil Rights, *Environmental Justice: Examining the Environmental Protection Agency's Compliance and Enforcement of Title VI and Executive Order 12,898* at 14 (2016).

¹⁹ EPA, *Environmental Justice Analysis for the Lower Duwamish Waterway Superfund Cleanup*, Draft 4 (2013), available at https://www3.epa.gov/region10/pdf/sites/ldw/pp/ej_analysis_ldw_feb_2013.pdf.

community involvement initiative for a community, EPA must take environmental justice issues into account."²⁰ Yet, EPA's health analyses and remedy selection for the Site ignore the fact that residents in OU1 have higher than typical exposure to lead, arsenic, and other contaminants due to cumulative exposures from being part of an environmental justice community. EPA's Residential Lead Handbook, under which EPA is managing the Site cleanup (*see* RI Final, Ex. I, at 2), expressly recognizes the need to understand cumulative lead exposure and directs EPA to test interior dust for lead (including from interior lead paint), test for exterior lead-based paint of homes, and test drinking water to understand exposure from lead pipes. (Residential Lead Handbook, Ex. F, at 25.) But in preparation of the HHRA and Remedial Investigation, EPA disregarded the Residential Lead Handbook when it did not test interior dust or look for exterior lead-based paint, and it deliberately declined to assess blood lead levels or drinking water.

EPA's Site Remedial Project Manager at the time, Michael Berkoff, explained that he did not need to evaluate blood lead levels, because he was guided by the 400 ppm lead cleanup standard laid out in the Residential Lead Handbook. (Letter from Michael Berkoff to Amy Legare, Nat'l Remedy Review Bd., Admin. Record for U.S. Smelter and Lead Refinery, Inc., Admin. Rec. Doc ID 424339 (June 25, 2012) ("Berkoff Letter"), attached hereto as Exhibit Y.) He later told the public that EPA did not undertake health studies because it did not need to wait for actual harm to act to clean up the site (2012 Public Meeting Transcript, Ex. K, at 36); however, EPA did *not* move forward quickly or alert residents of the need to get tested and seek medical care. EPA's remedial project manager's statements are outrageous in at least two ways: (1) EPA should have been encouraging testing of residents so that they could pursue appropriate medical care if their lead exposure had led to elevated blood lead levels or they exhibited

²⁰ EPA, USS Lead Community Involvement Plan 4-2 (2011), attached hereto as Exhibit Z.

symptoms associated with their arsenic exposure, and (2) the Site-specific blood lead level testing could have informed the health risk analysis and called for a tailored site-specific standard that differed from the generic 400 ppm standard. EPA also failed to do site-specific drinking water testing, instead relying on East Chicago's Water Department's annual testing of 30 homes in accordance with EPA's Lead and Copper Rule. (*See* Berkoff Letter, Ex. Y.) It is highly likely that most, if not all, of the 30 homes tested were not on this Superfund Site; therefore, relying on the results of those 30 tests as an indication of the exposure to lead through drinking water on the Site is meaningless. Again, if residents received drinking water test results that indicated lead exposure, they could have acted to protect their health.

In addition to the disregard for the Residential Lead Handbook's testing guidelines, EPA failed to consider how residents live within the community. In several instances, tightknit families—grandparents, families and children—have separate homes across the zones in OU1, and residents, especially young children, are being exposed at all of these homes throughout their daily lives. Children play in yards, parks, and the playground at school. Friends also travel between properties regularly. As discussed above, lead exposure is cumulative, though a single, significant exposure to lead and arsenic can detrimentally impact on a person's long-term health. The delayed cleanup in any of the zones will lead to continued and harmful exposure to these families. These are the exact types of issues that should have factored into the underlying risk assessments that formed the basis for EPA's selected remedy.

EPA has recognized expressly that increased citizen involvement in the Superfund process is one way to improve outcomes in environmental justice communities because it provides greater opportunity for EPA to understand the community's needs and enables residents to have a voice in the process. The creation of a Community Advisory Group role at Superfund

sites—an official body designed to serve as a conduit for information between the community and EPA—can promote environmental justice.²¹ At the USS Lead Site, EPA specifically acknowledged the need for community engagement in the Community Involvement Plan.²² Yet, EPA neither actively facilitated the formation of a Community Advisory Group early in the process, nor provided adequate opportunity for residents to learn about and comment on the Consent Decree's elimination of Zone 2 from the remedial plan. Allowing intervention here gives residents the opportunity they deserve to ensure that their homes and health are protected.

D. Applicants' Motion for Intervention is Timely

There is no bright-line rule to determine whether a motion to intervene is timely; rather, timeliness is determined by the totality of the circumstances. *NAACP v. New York*, 413 U.S. 345, 366 (1973); *Heartwood, Inc. v. U.S. Forest Serv., Inc.*, 316 F.3d 694, 701 (7th Cir. 2003). The Seventh Circuit considers four factors relevant to timeliness: (1) the length of time the intervenor knew or should have known of his or her interest in the case; (2) the prejudice caused to the original parties by the delay; (3) the prejudice to the intervenor if the motion is denied; and (4) any other unusual circumstances. *Heartwood*, 316 F.3d at 701. Courts "do not necessarily put potential intervenors on the clock at the moment the suit is filed or even at the time they learn of its existence. Rather, [courts] determine timeliness from the time the potential intervenors learn that their interest might be impaired." *Reich* 64 F.3d at 321 (citing *City of Chicago*, 870 F.2d at 1263; *South v. Rowe*, 759 F.2d 610, 612 (7th Cir. 1985))."

²¹ The Office of Solid Waste and Emergency Response recommended the creation of Community Advisory Groups to enhance public involvement in the Superfund cleanup process. (OSWER Environmental Justice Task Force Draft Final Report (EPA 540-R-94-004) (1994); *see also* Environmental Justice Interagency Working Group, Memorandum of Understanding 3 (2011), *available at* <https://www.epa.gov/sites/production/files/2015-02/documents/ej-mou-2011-08.pdf>.)

²² *See supra* n.20 and accompanying text.

Here, Applicants' motion to intervene is timely because it has been filed shortly after Applicants discovered the threat to their interests. Despite making fundamental changes to the scope of the remediation plan between publishing the ROD and publishing the Consent Decree, omitting an *entire* residential area from the remediation plan, EPA never held a public meeting regarding the final remediation plan as required by statute. Further, Applicants were only recently informed by EPA of the high levels of contamination on their properties—in some cases, *five years* after their properties were first tested. Indeed, EPA only released their testing results after it was revealed that contamination at the Public Housing adjacent to their properties required immediate evacuation and demolition. Denial of Applicants' Motion would severely prejudice Applicants, which outweighs any prejudice to the current Parties posed by intervention. Finally, the environmental justice concern implicated here, which has not been adequately addressed by EPA, constitutes an unusual circumstance that justifies intervention in this action.

II. IN THE ALTERNATIVE, THIS COURT SHOULD ALLOW PERMISSIVE INTERVENTION

While Applicants have demonstrated their right to intervene in this action, the circumstances also warrant permissive intervention. Under Federal Rule of Civil Procedure 24(b) ("Rule 24(b)"), permissive intervention is allowed "upon timely application when an applicant's claim or defense and the main action have a question of law or fact in common." Fed. R. Civ. P. 24(b)(2).

In *United States v. Metro. Water Reclamation Dist. of Greater Chi.*, No. 11 C 8859, 2012 WL 3260427, at *5 (N.D. Ill. Aug. 7, 2012), the Court found that a citizen's group could intervene as a matter of right in a case brought under the Clean Water Act. The court further stated that it would have allowed permissive intervention under Rule 24(b) even if had not found a right to intervention, explaining, "It is clear that the two proposed complaints in intervention

share common issues of law and fact with the plaintiffs' claims against defendant." *Id.* Similarly, in *In re Acushnet River & New Bedford Harbor Proceedings re Alleged PCB Pollution*, 712 F. Supp. 1019 (D. Mass. 1989), the court allowed permissive intervention, explaining that allowing a citizen group to permissively intervene adds the benefit of "another voice and set of concerns to participate in the resolution of an extremely complex matter, both factually and legally". *Id.* at 1025.

As the facts in this case have already established, Applicants clearly share in the common issues over the adequacy of the Consent Decree. Moreover, the citizen groups should be allowed intervention to ensure the local community, which is the party most affected by the Consent Decree, is finally given a proper voice.

CONCLUSION

Applicants' significant and legally recognized interests in their property and health are threatened by the fundamental changes that EPA has made to the USS Lead Site remediation plan without the required community input—both when EPA omitted Zone 2 from remediation in the Consent Decree and when EPA announced in the September 2, 2016 Status Report that it was putting remediation on hold—as well as the missteps EPA has made throughout the remediation selection process. Applicants thus move to intervene in this action in order to compel EPA to perform its obligations under CERCLA, including:

- 1) Ensuring that the remediation plan adequately protects human health and the environment and complies with all applicable federal and state laws, including:
 - Gaining a full understanding of lead exposures like basement water seepage, interior/exterior lead-based paint, indoor dust, possible drinking water contamination, and actual blood lead levels, and addressing as many of these exposures as possible;

- Conducting accurate soil contamination assessments based on current and appropriate sampling and analysis (e.g., laboratory testing instead of XRF testing);
 - Utilizing the appropriately protective standards for contamination for an environmental justice community; and
 - Identifying and remediating properties that meet the thresholds for other contaminants of concern that were inappropriately eliminated from consideration.
- 2) Ensuring that the remediation plan covers the entire residential area affected by contamination, as originally contemplated by the ROD.
 - 3) Ensuring that EPA adequately protects all residents from hazardous exposure during and after remediation activities, including:
 - Testing indoor dust before and after remediation;
 - Testing drinking water sources before and after remediation;
 - Monitoring the air inside homes throughout the process;
 - Adequately protecting HVAC systems and windows from bringing in contaminated air, including at residences that may not be on contaminated parcels but that may be nearby properties that are being remediated.
 - 4) Ensuring that the residents remain informed of and can provide input about the remediation plans.

In failing to meet these obligations, it is clear that the Government is not adequately representing Applicants' interests at this time. Applicants are thus entitled to intervene as a matter of right under either CERCLA, 42 U.S.C. § 9613(i), and Rule 24(a)(2) in order to ensure: (1) the remediation plan is adequately protective of human health and the environment; (2) the remediation plan covers the entire residential area affected by contamination, as originally contemplated by the ROD; and (3) that adequate protections from hazardous exposure are in place during and after remediation. In the alternative, Applicants request that this Court grant them permissive intervention under Rule 24(b)(1).

Dated: November 2, 2016

Respectfully submitted,

INTERVENORS

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CARMEN and GABRIELA GARZA
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RON ADAMS
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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that on November 2, 2016, he caused a true and correct copy of **APPLICANTS' MEMORANDUM OF LAW IN SUPPORT OF THEIR MOTION TO INTERVENE** to be served via the Court's ECF/electronic mailing system and/or email upon all counsel of record.

/s/ David Chizewer _____

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF INDIANA
HAMMOND DIVISION

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UNITED STATES OF AMERICA and	:	
STATE OF INDIANA,	:	
	:	
Plaintiffs,	:	
	:	Civil Action No. 2:14-cv-00312-PPS-PRC
v.	:	
	:	The Honorable Philip P. Simon
ATLANTIC RICHFIELD COMPANY and	:	
E.I. DU PONT DE NEMOURS AND	:	Oral Argument Requested
COMPANY,	:	
	:	
Defendants.	:	
-----	x	

APPLICANTS' REPLY BRIEF
IN SUPPORT OF THEIR MOTION TO INTERVENE

INTRODUCTION

CERCLA's intervention provision states that "*any person*" whose interests are threatened "may intervene *as a matter of right*" in "*any action*" commenced under CERCLA. 42 U.S.C. § 9613(i) ("§ 113(i)") (emphasis added). Congress added the intervention provision as part of the 1986 Superfund Amendments and Reauthorization Act *expressly* to make it easier for individuals "living in close proximity" to hazardous waste sites "to participate in these suits, particularly in fashioning the appropriate remedy for eliminating risk." S. Rep. 99-11, *reprinted in* Arnold & Porter LLP Legislative History: P.L. 99-499, at *58 (1985). Applicants here seek to exercise their intervention right in order to give residents at the USS Lead Superfund Site ("Site") a voice in the legal process that governs the remediation. Notably, only the United States, on behalf of the United States Environmental Protection Agency (collectively, "EPA"), filed an Opposition to Applicants' Motion to Intervene (Dkt. No. 24) ("Opposition" or "Opp'n")—neither Defendants nor the State of Indiana opposed Applicant's Motion to Intervene.

The critical facts here, undisputed by EPA's Opposition, warrant the residents' intervention:

1. EPA has known about the contamination at the Site since 1985 but did not declare Superfund status until 2009. Almost all residents were left unprotected in this 24-year interim. In fact, EPA cleaned 13 properties with severe lead contamination in 2008 (after originally testing those properties in 2003) but did not expand its testing to gauge the full extent of the risk to other residents at that time. (Applicants' Memorandum of Law in Support of Their Motion to Intervene (Dkt. No. 18) ("Opening Memorandum" or "Mem.") at 6–8.)
2. Even after adding the Site to Superfund's National Priority List ("NPL") in 2009, EPA notified virtually none of the residents about the dangerous levels of contamination at their individual properties such that they could have taken adequate precautions until the summer of 2016, when EPA revealed extremely high levels of contamination at the West Calumet Housing Complex. Other residents are only now learning the extent of contamination at their properties, even though they were visited by EPA in

2010 and signed formal access agreements in 2014 allowing EPA to enter and test their properties. (Mem. at 9–23; Opp'n at 11–12.)

3. EPA has still not committed to cleaning up Zone 2 via any formal mechanism, and remediation of Zone 1 has been postponed *indefinitely*. (Mem. at 30.)
4. EPA's Opposition confirms that there are flaws in the soil testing protocol that have caused serious delays in the remediation and called into question its accuracy. (*See* Declaration of Thomas Alcamo ("Alcamo Decl."), Opp'n Ex. D ¶¶ 27–31). EPA also acknowledges that the ATSDR health assessment, which undergirds the cleanup plan, needs to be redone. (*See* Declaration of Mark Johnson ("Johnson Decl."), Opp'n Ex. B ¶ 55; Section II.B.2, *infra*.)
5. Recently, testing has revealed additional sources of contamination, including drinking water contamination as well as indoor contamination, from both lead dust and basement water seepage. EPA has not adequately addressed these additional sources of contamination and did not account for them in the remediation plan, as required by its own manuals. These other sources of contamination add to residents' total exposure and should factor into the remediation plan. (*See* Section II.B.2, *infra*.)

These facts alone, as explained in more detail in both Applicants' Opening Memorandum and below, establish definitively that Applicants timely intervened as soon as they realized that EPA was not adequately protecting their interests.

The fatal flaws in EPA's Opposition are two-fold. First, the Opposition distorts both the plain language and express purpose of the statutory intervention provision. (*See, e.g.*, Opp'n at 1–2.) Second, EPA's Opposition reeks of a well-meaning but overburdened bureaucracy that has come to see the poisoning of a disenfranchised community as merely the "unfortunate result" of industrialization. (Opp'n at 2.) EPA offers to this Court unconscionable delays and 10-year-long cleanups as the benchmark of adequacy. Only an agency mired in bureaucratic fog could declare to this Court that "the system is working."

This case is far from over. In fact, the cleanup has begun in earnest only in the last few months. Further, as indicated in EPA's September 2016 Status Report and other

contemporaneous statements, the cleanup contemplated by the Consent Decree promises to change significantly from the Proposed Plan that was mailed to residents back in 2012 and adopted by the 2012 Record of Decision ("ROD").

CERCLA, designed to address public health threats quickly and effectively, requires more than what EPA has delivered to residents to date. After intervention is granted, the Court can resolve differences regarding the nature and extent of relief that is appropriate. EPA's view of the residents as an annoyance in this process or the Motion to Intervene as an interference with EPA's cleanup efforts does not comport with the text or purpose of the intervention provision, and the Court should not condone it.

ARGUMENT

The plain language and express purpose of the CERCLA intervention provision confirm Applicants' right to intervene in this case. Contrary to EPA's characterizations, Applicants' Motion to Intervene is not a separate action to challenge a cleanup subject to the jurisdictional bar of 42 U.S.C. § 9613(h) ("§ 113(h)"), and it does not seek to undo any of the removal efforts to date. Rather, under the statute, Applicants are entitled to participate in the legal process governing the *ongoing* cleanup to influence what still must be done. Applicants timely filed their Motion to Intervene promptly upon learning that EPA has not been adequately protecting their interests. Indeed, the sum total of the misleading notifications, the gross delay, the recent changes to the cleanup plan, the acknowledged mistakes, and the newly discovered forms of contamination which are not addressed in any current cleanup plan make it impossible for EPA to show that it "adequately represented" Applicants' interests as required to defeat this Motion to Intervene. Alternatively, Applicants are entitled to permissive intervention under Federal Rule of Civil Procedure 24(b) ("Rule 24(b)").

I. THE PLAIN LANGUAGE AND EXPRESS PURPOSE OF SECTION 113(i) PROVIDE APPLICANTS THE RIGHT TO INTERVENE.

By its plain language, § 113(i) affords residents living near a Superfund site the absolute right to become parties to a CERCLA action:

[A]ny person may intervene as a matter of right when such person claims an interest relating to the subject of the action and is so situated that the disposition of the action may, as a practical matter, impair or impede the person's ability to protect that interest, unless the President or the State shows that the person's interest is adequately represented by existing parties.

42 U.S.C. § 9613(i). The legislative history confirms that the very purpose of the CERCLA intervention provision is to allow citizens—in particular, residents of a Superfund site—to participate in the response process, just as Applicants hope to do here.

A. The Entire Purpose of CERCLA's Intervention Provision is for Citizens to Participate in the CERCLA Response Process.

The plain text of § 113(i) unambiguously allows residents of a Superfund site to intervene in a CERCLA action where their interests are threatened. The legislative history reveals that Congress added § 113(i)'s intervention provision *specifically* to ensure residents have a pathway to participate in the response process. Commenting on the incorporation of the intervention provision into § 113, the Senate Committee on Environment and Public Works ("EPW") explained:

The rules on intervention are intended to assure that persons living in close proximity (persons potentially at risk) to the subject of the government-initiated action will be able to intervene as a matter of right unless the President or the State can demonstrate that those persons' interests are being adequately represented. *The purpose of the amendments is to make it easier for individuals who may be assuming an imminent and substantial risk as a result of the defendant's activities to participate in these suits, particularly in fashioning the appropriate remedy for eliminating the risk.*

S. Rep. 99-11, *reprinted in* Arnold & Porter LLP Legislative History: P.L. 99-499, at *58 (1985) (emphasis added). Thus, courts have followed suit. *United States v. Vasi*, Nos. 5:90 CV 1167 &

5:90 CV 1168, 1991 WL 557609, at *3 (N.D. Ohio Mar. 6, 1991) ("[T]he real persons who Congress were attempting to protect through enactment of § 113(i) are those who live in close proximity to hazardous waste sites and who would, conceivably, be the most affected by proposed remedial schemes for cleaning up toxic waste dumps.").

EPA's insistence that "EPA alone has the authority to select the appropriate cleanup for this Site and decide how to implement it" (Opp'n at 1) simply does not comport with this clear Congressional mandate. In fact, § 113(i) was added over the Department of Justice's ("DOJ") explicit objection that intervention "greatly heightens the opportunity for intervenors to interfere with the government's control over its enforcement litigation." Statement of F. Henry Habicht, II, Assistant Attorney General, Land and Natural Resources Division, U.S. DOJ (June 2, 1985), reprinted in Arnold & Porter LLP Legislative History: P.L. 99-499, at *53. Congress rejected DOJ's concern and instead made clear that it intended § 113(i) to provide affected citizens with a clear pathway to intervention in CERCLA cases, which Rule 24 did not adequately provide. H.R. Rep. 99-253 (III), 99th Cong., 1st Sess. 24, *reprinted in* 1986 U.S. Code Cong. & Admin. News 3038, 3060 ("Given the very broad authority that courts have today to deny intervention motions, citizens with limited resources face almost insurmountable barriers to protecting their interests. This amendment, with ample precedent in the federal statutes mentioned above, would appropriately lower those barriers.").

B. Section 113(h) Has No Bearing on Applicants' Right to Intervene in This Case.

EPA mischaracterizes Applicants' exercise of their § 113(i) right to intervene as a *challenge* to an ongoing cleanup which EPA claims is subject to § 113(h)'s jurisdictional bar. (Opp'n at 22–23.) As relevant here, § 113(h) states as follows:

No Federal court shall have jurisdiction under Federal law . . . to review any challenges to removal or remedial action selected under section 9604 of this title . . . in any action except one of the following:

. . . (4) An action under section 9659 of this title (relating to citizens suits) alleging that the removal or remedial action taken under section 9604 of this title . . . was in violation of any requirement of this chapter. Such an action may not be brought with regard to a removal where a remedial action is to be undertaken at the site.

42 U.S.C. § 9613(h). This provision bars jurisdiction over another "action" seeking to interfere with a cleanup. Nothing in this provision indicates that it affects in any way the express right under § 113(i) for a resident to intervene in the underlying remediation case in which the Court's jurisdiction has already been properly invoked.¹ Indeed, the cases invoking the § 113(h) jurisdictional bar that EPA cites all involve separate actions; EPA cannot point to a single case where § 113(h) affected an applicant's right to intervene in the operative litigation. Intervention here is not a "backdoor" challenge to the ongoing cleanup. Rather, Applicants accept Congress' "front door" invitation to participate, expressly provided by § 113(i).

EPA's overly broad interpretation of § 113(h) creates tension, if not direct conflict, with the intervention rights in § 113(i). Section 113(h) is triggered at the time EPA selects the remedial action (*see Village of DePue v. Exxon Mobil Corp.*, 537 F.3d 775, 784 (7th Cir. 2008)). But EPA does not initiate a lawsuit until *after* it selects a remedy. Under EPA's argument, then, § 113(h) would prohibit courts from hearing any motion to intervene related to the remedy. True, subpart (h) gives some protection to EPA from interference with its cleanup. But at the same time, subpart (i) gives those with interests in the cleanup an express right to intervene in remedial actions. Congress added both of these provisions to CERCLA in its 1986 Amendments to the Act (*see* PL 99-499, October 17, 1986, 100 Stat 1613). As a basic tenet of statutory construction, the Court must read these provisions in a way that gives effect to both. *See Clark*

¹ Indeed, the exceptions to § 113(h) also deal with a separate action—not the operative CERCLA cleanup litigation.

v. Rameker, — U.S. —, 134 S. Ct. 2242, 2246–48 (2014) (quoting *Corley v. United States*, 556 U.S. 303, 314 (2009)) ("a statute should be construed so that effect is given to all its provisions, so that no part will be inoperative or superfluous").

EPA's Opposition fails even to acknowledge this tension, let alone offer a view on how to reconcile it. Neither the words of the statute nor the case law dictate to the Court how to resolve the tension created by EPA's view of § 113(h). To the extent this Court views § 113(h) as a possible bar to intervention, it must decide, in the context of this particular case, how to reconcile that possibility with the residents' express rights to intervene. In doing so, the Court should consider which is more important: (a) the intervention rights of a group of disenfranchised residents who suffered decades of hazardous environmental exposure and Governmental neglect, and then a flawed cleanup; or (b) EPA's hypothetical fear that the residents' participation in this legal proceeding would do more harm than good?

In any event, Applicants do not seek to undo the progress already made or to delay further plans. Instead, the relief Applicants seek (Mem. at 39–40) will allow Applicants to accomplish three main things:

1. Offer their voice to the plan changes and new plans that EPA has already acknowledged need to take place;
2. Request appropriate remediation based on information only recently discovered and disclosed by EPA; and
3. Ensure that EPA correctly identifies all remaining contaminated properties and hold EPA accountable for the timely remediation of those properties.

To the extent the Court believes that certain of the specific requests contained in Applicants' Opening Memorandum inappropriately interfere with the current cleanup plan, that issue can be addressed as part of the relief sought once intervention is granted. That should not affect the issue of intervention in the first instance.

II. APPLICANTS FILED THEIR MOTION TO INTERVENE PROMPTLY UPON LEARNING THAT EPA WAS NOT ADEQUATELY REPRESENTING THEIR INTERESTS.

Section 113(i) provides Applicants with the right to intervene here, and Applicants satisfy all four requirements for intervention under § 113(i) and Rule 24(a): (1) their application is timely; (2) they have an "interest" in the property or transaction that is the subject of the action; (3) the disposition of this action may impede or impair their ability to protect those interests; and (4) no existing party adequately represents their interests. *See Int'l Paper Co. v. City of Tomah*, No. 00-C-539-C, 2000 WL 34230089, at *2 (W.D. Wis. Nov. 30, 2000) (citing *Sec. Ins. Co. of Hartford v. Schipporeit*, 69 F.3d 1377, 1380 (7th Cir.1995)).

EPA disputes Applicants' satisfaction of only two of these four factors: timeliness and inadequate representation of Applicants' interests. (Opp'n at 12.) EPA is wrong on both accounts. Because of EPA's misleading or confusing disclosures, unjustifiable delay, and undisclosed changes to the original remediation plan, residents learned only recently that EPA was *not*—and is *not*—adequately representing their interests. Therefore, Applicants clearly meet the legal requirements to intervene in this case.

A. Applicants Filed Their Motion to Intervene Shortly After Learning of the Threat to Their Interests.

While timeliness of a motion to intervene is determined by the totality of the circumstances, the Seventh Circuit considers four factors relevant: (1) the length of time the intervenor knew or should have known of his or her interest in the case; (2) the prejudice caused to the original parties by the delay; (3) the prejudice to the intervenor if the motion is denied; and (4) any other unusual circumstances. *Heartwood, Inc. v. U.S. Forest Serv.*, 316 F.3d 694, 701 (7th Cir. 2003). Courts "do not necessarily put potential intervenors on the clock at the moment the suit is filed or even at the time they learn of its existence. Rather, [courts] determine

timeliness from the time the potential intervenors learn that their interest might be impaired." *Reich v. ABC/York-Estes Corp.*, 64 F.3d 316, 321 (7th Cir. 1995).

Here, the residents did not understand the full extent of the contamination at the Site until well after EPA conducted extensive testing in Zone 1 in 2015—the first extensive testing ever conducted at the Site. While preliminary results showed extremely high levels of contamination as early as May 2015, confirmed by systematic data in December 2015, Applicants did not learn the extent of Zone 1 contamination until June 2016, after EPA released the testing results to the City of East Chicago. Homeowners in Zones 2 and 3 did not learn the extent of the contamination of their specific properties until EPA released their sampling results in September 2016 or after. Not a single statement in any of the four Declarations submitted with EPA's Opposition contest these points. The fact that EPA has significantly ramped up its efforts since releasing the results of Zone 1 testing simply underscores the impact of those test results on the remediation plan here and demonstrates that there was not adequate knowledge before that point. EPA cannot now claim that residents should have intervened earlier.

Residents also had no reason to understand that Zone 2 was left out of the cleanup. The proposed remediation plan that EPA sent to residents in July 2012 clearly stated that the purpose of the cleanup plan was "[t]o clean up soil contamination in the USS Lead site residential area" and that "[t]his proposed plan is only for OU1 – the residential area." (Opp'n Ex. C-15 at 1.) Neither the Proposed Plan nor the ROD divided the residential area into zones. Two years later, the Consent Decree divided out into Zones and omitted Zone 2 from the cleanup entirely. Before the proposed Consent Decree was lodged on September 3, 2014, however, EPA failed to publish an explanation of the differences between the remediation outlined in the ROD and the proposed Consent Decree. EPA also failed to amend the ROD, as required by 40 C.F.R. § 300.435(c)(2).

(See Mem. at 13–14.) EPA apparently believes that its September 3, 2014 press release, which did make clear that the Consent Decree would fund work in only Zones 1 and 3 (Opp'n at 16), effectively informed the residents. Yet, EPA does not indicate if or where that press release was actually distributed. EPA gives one example of a "local newspaper" that picked up the story (*id.*), but that "local" newspaper was a paper in Merrillville, Indiana, 20 miles away from East Chicago—and it is not either of papers local to East Chicago identified by EPA's Community Involvement Plan. (Opp'n Ex. C-14 at B-4.)

While EPA also states that it followed up with two meetings in November 2014 (Declaration of Janet Pope ("Pope Decl."), Opp'n Ex. C ¶ 47), EPA offers no details about how it advertised those meetings, how many people attended, or what was said. Moreover, EPA acknowledges that a fact sheet about the Consent Decree sent to the residents indicated "Zone 2 would be cleaned up under a separate agreement." (Opp'n Ex. C-17.) EPA gave no indication that this "separate agreement" did not yet exist. These efforts did not effectively inform residents that: (a) their homes and their neighbors' homes were severely contaminated with lead and arsenic; or (b) EPA was indefinitely postponing the cleanup for all homes in Zone 2—one-third of the Site.

Recent developments in the cleanup also impact their interests such that intervention here is timely. EPA has indicated that it, yet *again*, is changing the remediation based on current developments at the Site. In its September 2, 2016 Status Report, EPA explicitly told the Court that it is in the process of reexamining the remedy selected for Zone 1 and is currently not proceeding with full implementation of the remedy selected by the 2012 ROD. (Sept. 2, 2016 Status Report, Mem. Ex. S, at 4.) Indeed, EPA explained in its Opposition that if the City of East Chicago changes the future use of the Public Housing, EPA may have to amend the

ROD. (Opp'n at 9.) EPA has further indicated that the ATSDR health assessment that formed the basis of the earlier cleanup plans is in the process of being redone. (Johnson Decl., Opp'n Ex. B ¶ 55.) And since the filing of Applicants' Motion to Intervene, EPA has discovered that at least some of Applicants' drinking water and the dust inside some of Applicants' homes are also contaminated. (See Alcamo Decl., Opp'n Ex. D ¶ 12; Letter from Jacob Hassan to Ronald Adams (Dec. 15, 2015), attached hereto as Exhibit 1).² These new developments further threaten Applicants' interests and may necessitate further changes to the remediation plan. These issues and this case are far from resolved.

Courts have found motions to intervene under CERCLA § 113(i) timely, even when filed years after CERCLA litigation began. See *City of Bangor v. Citizens Commc'ns Co.* ("*Bangor I*"), Civ. No. 02-183-B-S, 2007 WL 1557426, at *1–*4 (D. Maine, May 25, 2007), *aff'd on other grounds*, *City of Bangor v. Citizens Commc'ns Co.* ("*Bangor II*"), 532 F.3d 70 (1st Cir. 2008); *United States v. Alcan Aluminum, Inc.*, 25 F.3d 1174, 1181–83 (3d Cir. 1994). In *Bangor*, four and a half years after a city filed a CERCLA action against a PRP for the cleanup of a contaminated river, the State, which owned a significant portion of the contaminated area at issue, filed a motion to intervene. *Bangor I*, 2007 WL 1557426, at *1–*2. In deciding whether the motion was untimely, the court acknowledged that "[u]ndoubtedly, the State could have moved to intervene in this action much sooner." *Id.* at *3. Indeed, "the Court actually invited the State to intervene" almost four years prior to the filing of the motion, and therefore the State "certainly under[stood] the concerns expressed in the objections of the Third Parties regarding the belated nature of the State's request." *Id.* at *3. Nevertheless, the court found that the "timeliness inquiry is ultimately governed by the . . . four factors for timeliness[.]" and those

² EPA communicated to the Garzas via telephone that their indoor sampling results were above EPA health screening levels, but EPA has not yet communicated these results in writing. See Email from Annette Lang to Applicants' Counsel (Jan. 6, 2017), attached hereto as Exhibit 2.

factors favored intervention.³ *Id.* In considering those factors, the Court emphasized that the State's understanding of the threat to its interest had changed since the complaint was filed. *Id.*

Similarly, in *Alcan*, the Third Circuit reversed a district court's decision that a non-settling PRP's motion to intervene was untimely because it was brought four years after litigation began. 25 F.3d at 1181. The Third Circuit emphasized, "timeliness is not just a function of counting days; it is determined by the totality of the circumstances. Although the point to which the litigation has progressed is one factor to consider, it is not dispositive." *Id.* (citing *NAACP v. New York*, 413 U.S. 345, 366 (1973); *Nat'l Wildlife Fed'n v. Burford*, 878 F.2d 422, 433 (D.C. Cir. 1989), *rev'd on other grounds, sub nom. Lujan v. Nat'l Wildlife Fed'n*, 497 U.S. 871 (1990)). The Third Circuit explained that "to the extent there is a temporal component to the timeliness inquiry, it should be measured from the point which an applicant knows, or should know, its rights are directly affected by the litigation, not, as the government contends, from the time the applicant learns of the litigation." *Id.*; *see also Nat'l Wildlife Fed'n*, 878 F.2d at 433–34; *Stallworth v. Monsanto Co.*, 558 F.2d 257, 263–64 (5th Cir. 1977).

Notably, *Alcan* affords leniency to *polluters*—those whom CERCLA holds *accountable*—regarding the timing of their intervention. It only follows that the courts should extend at least the same leniency to disenfranchised *residents* of a Superfund site—the people CERCLA was designed to *protect*. *See also Reich*, 64 F.3d at 321 (citing *United States v. City of Chicago*, 870 F.2d 1256, 1263 (7th Cir. 1989) and *South v. Rowe*, 759 F.2d 610, 612 (7th Cir. 1985)) ("In the City of Chicago case, potential intervenors moved for intervention eight years after a consent decree was entered. In *Rowe*, a potential intervenor moved to intervene in a case to extend a consent decree that had been in effect for two years. In both cases, we held the

³ The four factors the First Circuit considers relevant to timeliness are virtually identical to the Seventh Circuit's timeliness factors. *Id.* at *2.

petitions for intervention to be timely because they were filed soon after the potential intervenors learned of the impairment of their respective interests").

EPA relies on *City of Bloomington, Ind. v. Westinghouse Elec. Corp.*, 824 F.2d 531, 535 (7th Cir. 1987), in which the Court denied as untimely a citizen group's motion to intervene 11 months after the commencement of CERCLA settlement negotiations. In *Westinghouse*, however, the citizen group admitted that it had "been interested in and involved with" the subject matter of the suit for years, including the filing of the suit and the commencement of settlement negotiations. The court found that there was no indication of circumstances that would have obscured or changed the citizen group's interests. *Id.*

Neither *Westinghouse* nor the other cases that EPA cites cover the situation where, as here, applicants: (1) learned the details regarding how the contamination affected their properties years after the litigation began; (2) were not properly notified that the litigation began; (3) had no reason to know that the remediation implemented by the litigation fundamentally differed from the proposed remediation plan; and (4) are also affected by recent circumstances that necessitate changing the remediation plan.⁴

Applicants here intervened in a timely manner when they learned of the threat to their interests. EPA claims that allowing intervention now would render the "work of negotiating and

⁴ See *United States v. Pitney Bowes, Inc.*, 25 F.3d 66, 73 (2d Cir. 1994) (applicant acknowledged it had actual knowledge of the lodging of the consent decree eight months before it moved to intervene); *United States v. Bliss*, 132 F.R.D. 58, 59–60 (E.D. Mo. 1990) ("[applicants'] own statement of the facts, contained in its reply memorandum, demonstrates that the [applicants] have long been aware of . . . this litigation, and have participated in various aspects of the state and federal processes addressing both"); *United States v. Mid-State Disposal, Inc.*, 131 F.R.D. 573, 577 (W.D. Wis. 1990) (denying a motion to intervene by non-settling PRPs who were not included in a consent decree between EPA as untimely where PRPs both had an "opportunity to comment on the proposed consent decree during the public comment period" and one PRP in fact did submit comments); *United States v. BASF-Inmont Corp.*, 819 F. Supp. 601, 606–07 (E.D. Mich. 1993), *aff'd*, 52 F.3d 326, at *3 (6th Cir. 1995) (finding intervention a year after entry of a consent decree untimely where the applicant had been a participant in the case as a non-party for several years and had submitted comments opposing the consent decree). The rest of the cases EPA cites do not even discuss whether the Motion to intervene was timely. See *United States v. W.R. Grace & Co.-Conn.*, 185 F.R.D. 184, 192 (D.N.J. 1999); *United States v. ABC Indus.*, 153 F.R.D. 603, 608 (W.D. Mich. 1993); *Vasi*, 1991 WL 557609, at *3–*4.

approving the consent decree" and the remedial work that has already been done a waste, as well as stop the remediation in its tracks. (Opp'n at 14.) But Applicants are not seeking to undo or delay EPA's cleanup efforts through intervention such that intervention would prejudice EPA. Rather, Applicants seek to participate in the remediation process going forward. Any prejudice to EPA posed by their intervention is outweighed by the prejudice Applicants face if this cleanup proceeds in the piecemeal, haphazard, and snail-like fashion it has so far. (Apparently, neither the State of Indiana nor Defendants viewed Applicants' participation as a threat to the process such that they felt the need to oppose Applicants' Motion to Intervene.)

B. EPA Does Not Adequately Represent Applicants' Interests.

In order to defeat Applicants' Motion, EPA must affirmatively "demonstrate" that it adequately represents Applicants' interests. Ignoring this burden, EPA instead attempts to invoke a "presumption of adequate representation" based on the "long-standing intervention law principle that the United States represents the public interest." (Opp'n at 17.) This argument is misplaced.

Unlike Rule 24(a), § 113(i) requires EPA to "demonstrate" affirmatively—not presume—that it adequately represents Applicants' interests. Indeed, when adding the CERCLA intervention provision, Congress purposefully shifted the "adequate representation" burden from the potential intervenor to the Government because it explicitly recognized that EPA does *not* always represent the interests of affected citizens when selecting a remedy:

Without this provision [Section 113(i)], Rule 24 of the Federal Rules of Civil Procedure would govern the right of citizens to intervene in such cases. In order to succeed in a Rule 24 motion, a party has the burden of establishing that no other party to the suit, such as EPA or a state, adequately represents the moving party's interest. The case law that has been developed under Rule 24 creates a presumption of adequate representation by government agencies, which essentially can be overcome by the moving party only by demonstrating bad faith or malfeasance. *That is a very difficult burden to meet.* Citizens, under Rule 24, are thus forced to spend a substantial store of their resources merely in

establishing their right to be in court. This obviously depletes the resources that they would otherwise have available to address the substance of their claim. *This amendment would shift to the EPA or to the State the burden of establishing that it adequately represents the citizen's interest.*

Given the very broad authority that courts have today to deny intervention motions, citizens with limited resources face almost insurmountable barriers to protecting their interests. This amendment, with ample precedent in the federal statutes mentioned above, would appropriately lower those barriers.

H.R. Rep. 99-253 (III), 99th Cong., 1st Sess. 24, *reprinted in* 1986 U.S. Code Cong. & Admin. News 3038, 3060 (emphasis added). Affording a presumption of adequate resident representation in favor of EPA and against the actual residents would not only contravene to the plain language of § 113(i), it would violate the very structure and the clear legislative intent of the statute.

Any case affording EPA such a presumption violates the statute and is wrongly decided. EPA cites a few cases where it was afforded an "adequate representation" presumption against a potential intervenor seeking to protect the nebulous "public interest," but, unlike those cases, Applicants here are intervening to protect *specific, personal interests*. See *Utah v. Kennecott Corp.*, 232 F.R.D. 392, 397–98 (D. Utah 2005) (applying a presumption of adequate representation where petitioner asserted his interest in the CERCLA litigation "by simply being a member of the public" rather than by asserting any personal interest); *W.R. Grace*, 185 F.R.D. at 191 (denying a township's motion to intervene in a CERCLA action where the township asserted a "public interest" in the action); *Bliss*, 132 F.R.D. at 60 (denying cities' motion to intervene where the cities' asserted a "public interest" in the action and patterned their complaint after the United States' complaint).⁵

⁵ The only adequate representation case EPA cites featuring an intervention attempt by residents living adjacent to a Superfund site did not apply or even reference § 113(i). See *BASF-Inmont Corp.*, 819 F. Supp. at 605–08. Moreover, the court in that case found intervention unnecessary because the applicants had already submitted briefs to the court on the same issues underlying their motion to intervene. *Id.* at 607.

Even if the Court *were* to apply such a presumption, EPA's conduct does not live up to that standard here because EPA failed to: (a) timely warn and protect residents of the contamination; (b) use reliable testing methods for arsenic; and (c) help rather than hinder the Community Advisory Group ("CAG").

1. Failure to Warn and Protect

EPA's failure to inform residents about contamination at their individual properties and the gross delay in effectuating the remediation have left residents unknowingly exposed to hazardous levels of lead and arsenic. Indeed, Zone 1 Applicants did not learn the extent of the contamination at the West Calumet Housing Complex until June 2016, even though EPA began extensively testing Zone 1 in November 2014. Residents living in Zones 2 and 3 did not learn the extent to which their individual properties were contaminated until September 2016, at the earliest, even though they signed access agreements as early as November 2014. Finally, EPA admits that it *knew*, by July 2015, that many properties in Zones 2 and 3 were highly contaminated. Alcamo Decl., Opp'n Ex. D ¶ 25. But EPA did not provide "Do Not Play in the Dirt" signs to residents in those Zones at that time—or any time.

EPA's Opposition suggests that the timeline for the testing, notification, and remediation is par for the course. (Opp'n at 16.) Yet, when the story of the contamination finally broke, EPA admitted that the delay was a result of problems with the remedial design process. In fact, the EPA Regional Administrator acknowledged that the delay was due to problems with the contractor the agency hired to tabulate the data and concerns about the data's quality.⁶ The residents' continued exposure to highly contaminated soils in contravention of the purposes and provisions of CERCLA does not amount to adequate representation.

⁶ Abby Goodnough, *Their Soil Toxic, 1,100 Indiana Residents Scramble to Find New Homes*, N.Y. Times, Aug. 30, 2016, http://www.nytimes.com/2016/08/31/us/lead-contamination-public-housing-east-chicago-indiana.html?_r=0.

2. Failure of EPA's Testing Methodologies

EPA's Opposition reveals that EPA botched both the soil testing and indoor testing methodologies—the sole determinants for whether or not a resident's property or home will be cleaned. These issues do not constitute a mere "difference of opinion" with EPA's chosen method of remediation. (*See* Opp'n at 18–19.) Rather, the issues Applicants' raise call into question the timeliness and reliability of the remediation. In an analogous situation where a potential intervenor called into question the Government's measurement of damages in a CERCLA litigation, a court found that the Government did not adequately represent the potential intervenor. *See In re Acushnet River & New Bedford Harbor*, 712 F.Supp. 1019, 1024 (D. Mass. 1989) ("the substantial divergence of views on the proper measure of damages between the sovereigns and the [applicant] necessarily renders the formers' representation of the latter inadequate").

EPA's own documents acknowledge that X-Ray Fluorescence ("XRF") is unreliable for testing arsenic when in the presence of lead, particularly at arsenic levels less than 40 ppm (which are still dangerous).⁷ Yet, EPA employed XRF testing throughout Zones 1 and 3. (Alcamo Decl., Opp'n Ex. D ¶ 14; Ballotti Decl., Opp'n Ex. A ¶ 28(c)(ii).) EPA accounted for its use of XRF in Zones 1 and 3 by sending a subset of the results to the lab, comparing the lab results to the XRF results, and then creating a "corrective equation" to apply to the entire data set. (Ballotti Decl., Opp'n Ex. A ¶ 28(c)(iv); Alcamo Decl., Opp'n Ex. D ¶¶ 17–21). Yet during the briefing on this Motion to Intervene, EPA admitted for the first time that it realized back in August 2016 that the corrective equation did not work. EPA then created a new statistical

⁷ EPA Region 4, Science and Ecosystem and Support Division, Field X-Ray Fluorescence Measurement 6 (2015), Mem. Ex. O (explaining that when lead and arsenic are present in the same soil, XRF would not be an appropriate way to test for arsenic); EPA, Method SW-846-6200 (2007), *available at* <https://www.epa.gov/sites/production/files/2015-12/documents/6200.pdf>.

analysis, without reference to any of the well-established EPA protocol or methods. (Alcamo Decl., Opp'n Ex. D ¶ 31.) These mishaps delayed notification of testing results for a year. (*See* n.6, *supra*.) Notably, the new analysis means that the XRF arsenic results that are being reported to residents are not reliable—residents may never know for sure the intensity of their arsenic exposure. This new off-road analysis does not rely on the accuracy of specific arsenic readings—it merely purports to answer a binary question of whether the contamination is bad enough to justify cleanup. The lack of transparency regarding this new statistical analysis calls into question the accuracy of even that determination.

EPA testing has also recently revealed that there is contaminated indoor dust and contaminated drinking water in at least some of Applicants' homes. (*See* Alcamo Decl., Opp'n Ex. D ¶ 12; Letter from Jacob Hassan to Ronald Adams (Dec. 15, 2015), Ex. 1; *supra* n.2.) These developments present a severe public health problem that EPA has not yet addressed. According to its own handbook, EPA should have discovered and considered these other sources of contamination when developing the remediation plan in the first place. (*See* Mem. at 35 (citing Residential Lead Handbook, Mem. Ex. F, at 25.) EPA is not acting with urgency with regard to these newly discovered harms, even though they acknowledge that these levels of lead and arsenic are unsafe. For example, when EPA notified the Garzas of the indoor dust contamination by telephone on November 12, 2016, EPA told Applicant Carmen Garza she should avoid using their basement where the washer and dryer sit. (Alcamo Decl., Opp'n Ex. D ¶¶ 12(j)-(k).) But EPA does not plan to clean the inside of her home until some undefined time in the first quarter of 2017. (*Id.* ¶ 12(l).) The Garzas are faced with increased, cumulative lead exposure from their indoor dust for up to four months as well as persistent anxiety about living in their home. EPA has indicated that Applicants Mauro and Sara Jimenez's home's indoor lead

dust testing will be redone because the initial results may not have been accurate. (Email from Annette Lang to Applicants' Counsel (Jan. 6, 2017), Ex. 2.) The uncertainty about the testing creates additional anxiety about the safety of their home. These problems with the remediation belie EPA's claim of adequate representation.

3. Failure to Help the CAG

The "other means" EPA suggests residents have to participate are inadequate to protect their interests. (Opp'n at 12.) EPA suggests that the residents' voice should be expressed through a CAG—not through intervention. Yet, since Applicants filed their Motion to Intervene, EPA has actually hindered, not helped, the CAG's operation. Despite the fact that a properly formed CAG has met weekly since October 8, 2016, EPA has questioned the CAG's reflection of the community and its relationship to its counsel. *See* Email from Catherine Garypie to Deborah Chizewer, *et al.* (Dec. 7, 2016), attached hereto as Exhibit 3. In particular, EPA has used the residents' multi-faceted approach to community organizing as an excuse not to provide assistance to the CAG or even acknowledge that there is only one CAG. (Pope Decl., Opp'n Ex. C ¶ 94.) In any event, EPA cites not a single provision in the CERCLA statute or a case to suggest that a CAG is a substitute for intervention or that it even curtails the residents' intervention rights in any way.

III. IN THE ALTERNATIVE, PERMISSIVE INTERVENTION IS APPROPRIATE HERE.

Under Rule 24(b), the Court may permit anyone to intervene who, "on timely motion . . . has a claim or defense that shares with the main action a common question of law or fact." Fed. R. Civ. P. 24(b)(1)(B). For all reasons previously stated, this Court should permit intervention. But additional reasons warrant this Court's discretionary power here.

Perhaps the most important take away from this briefing is that none of these serious issues, worthy of this Court's examination, would have been brought to this Court's attention if not for the residents. They are uniquely situated to bring important facts and legal arguments to this process, which by itself is an appropriate basis for permissive intervention. *See Utah v. Kennecott Corp.*, 801 F. Supp. 553, 572 (D. Utah 1992) (denying "intervention of right" but granting "permissive intervention" to a party "uniquely situated to significantly contribute to the underlying factual and legal issues"); *In re Acushnet River*, 712 F. Supp. at 1022–26 (granting permissive intervention to an environmental group that added the benefit of "another voice and set of concerns to participate in the resolution of an extremely complex matter, both factually and legally").

One final consideration. Put aside for a moment whether EPA has made even a single mistake or misstep in this entire process. This community has been exposed to decades of serious environmental contamination—and its Government, after years and years of opportunity, has still has not fixed the problem. EPA essentially asks this Court to keep the residents out of EPA's way. But this Court should not endorse the exclusion of residents in favor of those who polluted their properties and endangered their health and those who have so far failed to fix the problems. Our judicial system generally, and the intervention rights specifically, offer more than the critical input of the residents; they provide agency and voice to those most affected. The facts here not only warrant, but demand the residents' participation in the lawsuit.

Dated: January 13, 2017

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that on January 13, 2017, he caused a true and correct copy of **APPLICANTS' REPLY BRIEF IN SUPPORT OF THEIR MOTION TO INTERVENE** to be served via the Court's ECF/electronic mailing system and/or email upon all counsel of record.

/s/ David J. Chizewer

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF INDIANA
HAMMOND DIVISION**

UNITED STATES OF AMERICA and
STATE OF INDIANA,

Plaintiffs,

v.

ATLANTIC RICHFIELD COMPANY and
E.I. DU PONT DE NEMOURS AND
COMPANY,

Defendants.

X

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Civil Action No. 2:14-cv-00312-PPS-PRC

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Judge Philip P. Simon

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Magistrate Judge Paul R. Cherry

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**APPLICANTS' OBJECTION TO
MAGISTRATE'S OPINION AND ORDER**

On November 1, 2016, Applicants filed a Motion to Intervene in this CERCLA case, supported by 41 pages of briefing and more than 1,300 pages of supporting exhibits. The Memorandum supporting the Motion describes in detail the tragic environmental harm to, and official disregard for, the community living on the USS Lead Site in East Chicago, Indiana, and it provides the legal support behind Applicants' absolute right to intervene in this case under CERCLA Section 113(i). The Magistrate's Opinion and Order denying the Motion does not discuss in detail the harm suffered by the residents or the interest they have in the future clean-up activity—including impacts to their health and/or property values. Dkt. No. 34 (the "Opinion"). Instead, the Opinion's sole basis for denying Applicants' Motion to Intervene was that the residents did not act quickly enough.

The Opinion raises an important question: When a community has been subject to decades worth of pollution and delay, how quickly should the community be required to act to

enforce its legal rights? On its face, the Opinion appears to apply the timeliness factors announced by the Seventh Circuit. But the Opinion misinterprets much of the evidence and ignores the important context of this case. Indeed, blasting a "fact" sheet to the community, issuing a press release subject to the whim of reporter and resident reading habits, and resorting to notices in the *Federal Register* are not adequate or realistic ways to inform under-resourced individuals about the specific level and extent of contamination tainting their properties. Thus, it is no surprise that Superfund Site residents were both shocked and panicked when they were told, for the first time, in July 2016, that one-third of the residents would have to permanently evacuate their homes due to contamination that EPA had been studying since 1985. At that point, the residents quickly formed several community advocacy groups, assembled a legal team, and filed their Motion to Intervene.

In assessing the length of time it took the community to organize, these efforts should be considered in the following context:

1. It took *decades* to stop a host of corporations from knowingly polluting the residents' properties and poisoning them with lead and arsenic;
2. It took EPA 24 years after knowing about the severe contamination of the residents' properties to declare Superfund status on the Site;
3. It took EPA another 5 years after declaring Superfund status to actually negotiate funding for the clean-up of just a portion of the Site;
4. It took EPA another 2 years after negotiating the funding even to begin any serious clean-up efforts; and
5. It took EPA 9 months after it obtained the contamination results on specific residential properties to inform the owners of those properties of the results.

In light of these undisputed facts, imagine the residents' reaction to learn that it is *they* who flunked a timeliness test. This comparison is more than clever rhetoric. The CERCLA intervention rights incorporate an element of fairness by giving those most interested a voice in

the legal process. The Opinion holds the *victims* to an unreasonable timing requirement that does not comport with the law.

This case was filed on September 3, 2014; the Consent Decree was lodged that same day and entered by the Court on October 28, 2014. Two years later, it became clear that the Consent Decree remedy would be modified. The residents of the Site's public housing complex were then told for the first time that the contamination was so severe that they had 60-90 days to permanently relocate. Immediately, the community organized, and filed their Motion to Intervene on November 1, 2016.

In evaluating timeliness, the Opinion relied heavily on the fact that EPA previously issued a couple of flyers and held some community meetings that provided very general Site information. The Opinion dismissed the fact that residents did not learn about the contamination of their *individual* properties until the fall of 2016. The Magistrate expected that residents should have read EPA's 2012 documents and immediately understood the actual impact on their individual properties two years before this lawsuit was filed, researched their rights under CERCLA, and assembled a legal team to vindicate their intervention rights.

The Opinion not only oversimplified a complicated and confusing set of notices, it also virtually ignored important changes in circumstances at the Site in 2016 that also threaten Applicants' interests. The Opinion thus inappropriately discounted the probability of the Consent Decree's modification, which is now a near certainty. Instead, the Opinion used the timeliness requirements to shield the existing parties—the polluters and EPA—from resident involvement. That approach does not conform to the purpose of the Section 113(i) intervention right or the case law interpreting it. The proper application of the timeliness factors should vindicate the residents' right to intervene.

ARGUMENT

After referring a dispositive motion to a magistrate judge, a district court has discretion to accept, reject, or modify, in whole or in part, the findings or recommendations of the magistrate judge. 28 U.S.C. § 636(b)(1). Where a party timely files an objection to the magistrate's ruling, the district court must make "a de novo determination of those portions of the report or specified proposed findings or recommendations to which objection is made." *Id.*; *see also Johnson v. Zema Sys. Corp.*, 170 F.3d 734, 739 (7th Cir. 1999) (citing *Goffman v. Gross*, 59 F.3d 668, 671 (7th Cir. 1995)).

The parties do not dispute the standard for analyzing the timeliness of a motion to intervene under Section 113(i). The timeliness of a motion to intervene is determined by the totality of the circumstances, and the Seventh Circuit considers four factors relevant: (1) the length of time the intervenor knew or should have known of his or her interest in the case; (2) the prejudice caused to the original parties by the delay; (3) the prejudice to the intervenor if the motion is denied; and (4) any other unusual circumstances. *Heartwood, Inc. v. U.S. Forest Serv.*, 316 F.3d 694, 701 (7th Cir. 2003).

These factors are often analyzed leniently in support of intervention rights. Courts "do not necessarily put potential intervenors on the clock at the moment the suit is filed or even at the time they learn of its existence. Rather, [courts] determine timeliness from the time the potential intervenors learn that their interest might be impaired." *Reich v. ABC/York-Estes Corp.*, 64 F.3d 316, 321 (7th Cir. 1995); *see also City of Bangor v. Citizens Commc'ns Co. ("Bangor I")*, Civ. No. 02-183-B-S, 2007 WL 1557426, at *1–*4 (D. Maine, May 25, 2007), *aff'd on other grounds*, *City of Bangor v. Citizens Commc'ns Co. ("Bangor II")*, 532 F.3d 70 (1st Cir. 2008) (allowing intervention after four and a half years because the threat to the interest had changed); *United States v. Alcan Aluminum, Inc.*, 25 F.3d 1174, 1181–83 (3d Cir. 1994) (allowing

intervention four years after litigation began). (*See also* Reply, Dkt. No. 32, at 10–13.) The Opinion ignored these cases in favor of a hollow application of the timeliness factors. This Court should apply these cases to the facts here and grant intervention.

I. The Opinion Starts the Timeliness Clock With Notices that Pre-Date the Actual Lawsuit By Two Years.

In concluding that the Applicants "knew or should have known of their interest in the case" years before their Motion to Intervene (Opinion at 4), the Opinion incorrectly relies on a notice mailed in July 2012—two years before the suit was even filed:

Thus, Applicants learned of (or should have learned of) their interest in this matter (though not in this specific cause of action, which had not yet been filed) in July 2012.

(*Id.* at 5). Notably, the July 2012 notice is a six-page, single-spaced article of information that looks like it belongs in a scientific journal. (Attachment C-15 to Janet Pope Declaration, Dkt. No. 24-4.) The document explains how EPA has been periodically testing the properties from as far back as 1985. (*Id.* at 2.) It is unreasonable to expect that residents should have understood from this 2012 notice that their *individual* properties must be highly contaminated and that they should assemble a legal team to intervene in forthcoming litigation.

Moreover, EPA's July 2012 notice recommends a plan that would spend \$26 million to clean up the *entire residential area* of the Superfund Site—Zones 1, 2 and 3. Two years later, EPA entered into a Consent Decree for approximately the same amount of funding stated in the July 2012 notice. EPA had been monitoring the situation for the past 25 years. If anything required the residents' urgent attention—such as the Consent Decree's omission of an entire Zone from the clean-up, EPA surely should have communicated that fact specifically. Indeed, no one has ever concluded that a clean-up of Zone 2, which was omitted from the Consent Decree, was any less urgent than the remediation of the other Zones.

The Magistrate's conclusion that this July 2012 notice advised Applicants of a need to intervene in litigation that would occur two years later does not comport with the law or the constraints facing this environmental justice community. Rather, it imposes an impossible burden on Applicants that renders their rights meaningless. Applicants urge this Court to review the July 2012 notice in full and ask whether (1) the envelope containing the notice would have alerted someone even to open it and read it in full—an issue not addressed in EPA's or DOJ's response; (2) what would make someone read such a technical notice from start to finish; and (3) after reading the notice from start to finish, who would understand the issues well enough and be alarmed enough to organize the community to assemble a pro bono legal team which could advise on their intervention rights and take on that burden?

The Opinion also concludes that Applicants had actual notice of the Consent Decree because it was published in the *Federal Register*, and then explained in an EPA press release and picked up by one newspaper. (Opinion at 5.) These remote sources of information cannot serve as the type of notice that can be used to cut off the Applicants' intervention rights. (*See Reply*, Dkt. No. 32, at 10.) The Opinion also points to the Consent Decree itself, a 293-page legal document that the residents never even received. Notably, the Consent Decree required the Defendants to pay \$26 million towards the clean-up—approximately the same amount of money EPA proposed in the July 2012 notice to clean up *the entire Site*. Thus, any resident who actively reviewed the terms of the Consent Decree might have reasonably concluded it provided for a clean-up of the *entire* residential area. Finally, a subsequent notice to the community provided *after* the Consent Decree was entered indicated simply that Zone 2 was to be cleaned up "under a separate agreement." The notice failed to indicate that no such "separate agreement" currently existed or that the clean-up of Zone 2 was delayed indefinitely. Why

would anyone reading that notice conclude that the remediation of Zone 2 would be delayed at all? No one offered any reason to believe that Zone 2 was any less contaminated than Zone 3.

In its opposition to the Motion to Intervene, EPA argued that it was not unusual for the Consent Decree to cover only two Zones, even though the ROD covers. (Opp. Br., Dkt. No. 24, at 15.) But EPA does not cite a single case where the Consent Decree differs from the ROD in terms of the area covered. In fact, the referenced Douglas Ballotti Declaration discusses the Jacobsville, Indiana site where there was no consent decree, the Government funded the clean-up, and the distinct residential areas were addressed under different RODs. (*See* Douglas Ballotti Decl., Dkt. No. 24-2, ¶ 23.)

In light of these facts, it is clear that the residents did not know—and had no reason to know—of their interests in this case in 2012 or 2014.

II. The Opinion Misconstrues the Actual Prejudice to the Existing Parties.

In concluding that intervention now would prejudice the polluters and EPA, the Opinion reasons, "[t]his case was closed over two years ago. To allow Applicants to intervene now to disturb that Consent Decree—especially where there are no pending motions to alter that Decree—would be highly prejudicial to the parties, who have already negotiated, settled, and obtained judgment in this case." (Opinion at 6). The Magistrate's assumption that intervention would prejudice all of the parties was inappropriate because the polluters and Indiana Department of Environmental Management, parties to the case, did not even object to the Motion to Intervene, signaling that they were not concerned about any prejudice caused by intervention. Moreover, virtually no clean-up activity occurred from the time the Consent Decree was entered until late 2016. (*See* Janet Pope Decl., Dkt. 24-4, at 8–19.) Even the signs telling residents not

to play in the dirt or mulch in their yards were not placed anywhere on the Site until July 2016—*two years* after the Consent Decree was entered. And then, only in Zone 1—not Zones 2 or 3.

More importantly, the Opinion acknowledged that "[Applicants] only wish to participate in the remediation process *going forward* and not to undo work already performed." (Opinion at 6 (emphasis added).) Yet the Magistrate concluded, without any support, that somehow Applicants' involvement would delay the clean-up of their own properties. Why would Applicants take a litigation position that would adversely affect the clean-up of their own properties? Not only does that conclusion find no factual support, it is counter to the intervention rights provided to the very individuals whose interests are at issue.

Finally, the reason that Applicants intervened now is that testing revealed contamination so severe that one-third of the residents were required to permanently relocate. EPA itself indicated that it is making both changes and additions to the clean-up from what was stated in the Consent Decree. Applicants' briefing pointed to important and compelling indications that the Consent Decree would be modified. First, EPA's September 2, 2016 Status Report states that "EPA is in the process of reexamining the remedy selected for the WCHC in the 2012 ROD", and that the "remedy reexamination has been prompted and may be affected by . . . future land use changes." (Mem., Dkt. No. 18, at 17–18 (citing Sep. 2, 2016 Status Report, Dkt. No. 11, at 4).) Second, EPA indicated that the ATSDR Health Assessment that formed the basis of the earlier clean-up plan was being redone. (Reply, Dkt. No. 32, at 11.) The Consent Decree incorporates and attaches the ROD. (Consent Decree, Dkt. No. 8, at 6, ¶ dd.) If the remedy described in the ROD is changed, the costs will change, and the Consent Decree will be modified.

The Magistrate dismissed these future changes by noting that the mere "chance" that a change may be sought in the Consent Decree could not overcome the other factors. (*Id.* at 7.) But EPA's Status Report, and the likely changed future use and remedy for Zone 1, as well as the pending groundwater and public health assessments go far beyond "chance." Rather, these changes are a virtual certainty. Indeed, events since the completion of the briefing on this Motion prove that the Consent Decree will be modified.

As of May 16, 2017, the West Calumet Housing Complex, in Zone 1, has been almost entirely evacuated, with fewer than 10 families remaining, and the City of East Chicago plans to demolish the buildings as soon as possible, thus requiring a different clean-up plan. EPA has indicated, in public meetings and in the press, that it has begun a new feasibility study for Zone 1 to evaluate the clean-up options depending on East Chicago's adjusted future use for the land.¹ Why would EPA undertake a second feasibility study unless it expected the remedy and the associated costs of the remedy to change?

In addition, the polluters and EPA already altered the remedy and costs for Zone 3 when, on March 16, 2017, they entered an Administrative Settlement and Administrative Order on Consent ("Administrative Settlement") (which also includes additional parties—Chemours and U.S. Metals Refining Company) (attached hereto as Exhibit A, appendices omitted). The Administrative Settlement overlaps with the Consent Decree by addressing the indoor lead and arsenic dust for Zone 3 properties that will be remediated. The assessment and abatement of indoor lead and arsenic dust was not included in the ROD, which means that residents had not previously had an opportunity to comment on EPA's plan. The residents also did not have the

¹ Lauren Cross, *EPA Urges East Chicago to Determine West Calumet's Future Use*, The Times of Northwest Indiana, http://www.nwitimes.com/news/local/lake/epa-urges-east-chicago-to-determine-west-calumet-s-future/article_2250b8ed-16d7-5701-9922-002cbe329a54.html.

opportunity to comment on the plans for assessment and abatement of indoor lead and arsenic dust described in the Administrative Settlement. Once again, EPA excluded the residents from participating in determining what should happen to their homes and properties.

Since the filing of Applicants' Motion, EPA also has stated at public meetings that it will undertake a groundwater study at the Site and will change the remedy as needed based on that study. Further, ATSDR is undertaking a new public health assessment to rectify the flawed 2011 report and to incorporate new data; EPA also has stated that it will alter the remedy as appropriate based on the groundwater and public health assessments.

Given these changes, and Applicants' focus on the future, Applicants' intervention now cannot possibly prejudice parties "who have already negotiated, settled, and obtained judgment in this case." (Opinion at 6.)

III. The Opinion Conflates "the Prejudice to the Applicants" With "the Length of Time They Knew of Their Interest in the Case."

The Opinion concludes that because Applicants have known of their interest in the case for two years or more, denying the Motion to Intervene would not prejudice them. But the length of time they have known about the case, and the prejudice they would suffer from being shut out, are independent considerations. Of course, we have explained above why Applicants did not know of their interest in the case until the Zone 1 evacuation announcement. But even if they had known earlier, denial of their intervention rights would still prejudice them in these circumstances. As explained above, the clean-up remedies are changing and without a voice in the legal proceeding which governs those changes, the residents lose out on the ability to determine their own fate. Applicants' ability to protect their health and property values are adversely impacted by a denial of the Motion to Intervene. The Opinion places the residents' fate in the hands of the polluters and EPA. The prejudice from deferring to these existing parties is

clear, as described in the underlying Memorandum. (*See* Mem., Dkt. No. 18, at 38; *see also* Reply, Dkt. No. 32, at 14.)

IV. Unusual Circumstances Warrant Intervention.

The Opinion relies almost entirely on the supposed notices offered to the community. While the inadequacy of the notices have been explained above, the problems do not end there. Even if such notices *were* adequate as written, they did not and could not capture the extent or severity of the contamination at the Site, which not even EPA was aware of until it finally conducted extensive testing in 2016. The Opinion also entirely neglects to acknowledge, much less consider, that Applicants are members of an environmental justice community who EPA failed to protect. (Mem., Dkt. No. 18, at 33–36, 38.) After being exposed to the contamination at the USS Lead Site for decades longer than necessary, the community deserves and is entitled to a voice in the legal process.

CONCLUSION

For the foregoing reasons, Applicants request that this Court enter an Order Granting Applicants' Motion to Intervene.

Dated: May 16, 2017

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that on May 16, 2017, he caused a true and correct copy of **APPLICANTS' OBJECTION TO MAGISTRATE'S OPINION AND ORDER** to be served via the Court's ECF/electronic mailing system and/or email upon all counsel of record.

/s/ David J. Chizewer

EXHIBIT A

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:

U.S. Smelter and Lead Refinery, Inc.
Site, East Chicago, Indiana

Atlantic Richfield Company,
E. I. du Pont de Nemours and Company,
The Chemours Company FC, LLC, and
United States Metals Refining Company,

Respondents.

Proceeding Under Sections 104, 106(a),
107 and 122 of the Comprehensive
Environmental Response, Compensation,
and Liability Act, 42 U.S.C. §§ 9604,
9606(a), 9607 and 9622

Docket No. **V-W-17-C-004**

**ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT
FOR REMOVAL ACTIONS IN ZONES 2 AND 3 OF OPERABLE UNIT 1 OF
THE U.S. SMELTER AND LEAD REFINERY, INC. SUPERFUND SITE**

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APPENDICES

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- Appendix C: Map of USS Lead Site OU1 – Zones 1, 2, and 3
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- Appendix G: Action Memorandum–4th Amendment
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- Appendix J: Form of Financial Assurance: Surety Bond (Chemours)
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I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent is entered into voluntarily by the United States Environmental Protection Agency (EPA) and Atlantic Richfield Company, E. I. du Pont de Nemours and Company, The Chemours Company FC, LLC, and United States Metals Refining Company (Respondents). This Administrative Settlement Agreement and Order on Consent provides for the performance of certain removal actions by Respondents and the payment of certain response costs incurred by the United States at or in connection with Zones 2 and 3 of Operable Unit 1 of the U.S. Smelter and Lead Refinery, Inc. Superfund Site (the “Site”) in East Chicago, Indiana. This Administrative Settlement Agreement and Order on Consent shall hereafter be referred to as the Z2&3 ASAOC.

2. This Z2&3 ASAOC is issued under the authority vested in the President of the United States by Sections 104, 106(a), 107, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9604, 9606(a), 9607 and 9622 (CERCLA). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580, 52 Fed. Reg. 2923 (Jan. 29, 1987), and further delegated to Regional Administrators by EPA Delegation Nos. 14-14-A (Determinations of Imminent and Substantial Endangerment, Nov. 1, 2001), 14-14-C (Administrative Actions Through Consent Orders, April 15, 1994) and 14-14-D (Cost Recovery Non-Judicial Agreements and Administrative Consent Orders, May 11, 1994). These authorities were further redelegated by the Regional Administrator of EPA Region 5 to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-14-A, 14-14-C, and 14-14-D.

3. EPA has notified the State of Indiana (State) of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

4. EPA and Respondents recognize that this Z2&3 ASAOC has been negotiated in good faith and that the actions undertaken by Respondents in accordance with this Z2&3 ASAOC do not constitute an admission of any liability. Respondents do not admit, and retain the right to controvert in any subsequent proceedings other than proceedings to implement or enforce this Z2&3 ASAOC, the validity of the findings of facts, conclusions of law, and determinations in Sections IV (Findings of Fact) and V (Conclusions of Law and Determinations) of this Z2&3 ASAOC. Respondents agree to comply with and be bound by the terms of this Z2&3 ASAOC and further agree that they will not contest the basis or validity of this Z2&3 ASAOC or its terms in any action to implement or enforce this Z2&3 ASAOC.

II. PARTIES BOUND

5. This Z2&3 ASAOC is binding upon EPA and upon Respondents and their successors, and assigns. Any change in ownership or corporate status of a Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter such Respondent’s responsibilities under this Z2&3 ASAOC.

6. Respondents are jointly and severally liable for carrying out all activities required by this Z2&3 ASAOC. In the event of the insolvency or other failure of any Respondent to

implement the requirements of this Z2&3 ASAOC, the remaining Respondents shall complete all such requirements.

7. Each Respondent certifies that its undersigned representative is fully authorized to enter into the terms and conditions of this Z2&3 ASAOC and to execute and legally bind that Respondent to this Z2&3 ASAOC.

8. Respondents shall provide a copy of this Z2&3 ASAOC to each contractor hired to perform the Zone 2 Temporary Storage, Transportation and Disposal Work (Z2 TST&D Work) required by this Z2&3 ASAOC and to each person representing any Respondent with respect to the Z2 TST&D Work, and shall condition all contracts entered into hereunder upon performance of the Z2 TST&D Work in conformity with the terms of this Z2&3 ASAOC. Respondents or their contractors shall provide written notice of the Z2&3 ASAOC to all subcontractors hired to perform any portion of the Z2 TST&D Work required by this Z2&3 ASAOC. Respondents shall nonetheless be responsible for ensuring that their contractors and subcontractors perform the Z2 TST&D Work in accordance with the terms of this Z2&3 ASAOC.

III. DEFINITIONS

9. Unless otherwise expressly provided in this Z2&3 ASAOC, terms used in this Z2&3 ASAOC that are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Z2&3 ASAOC or its attached appendices, the following definitions shall apply:

a. “2014 Consent Decree” shall mean the Consent Decree entered in the case of *United States, et al. v. Atlantic Richfield Co., et al.*, Civil Action No. 2:14-CV-312 (N.D. Ind.) on October 28, 2014.

b. “Action Memorandum–4th Amendment” or “Fourth Amendment” shall mean the document titled “Action Memorandum–4th Amendment” transmitted by EPA Region 5 to EPA Headquarters on October 24, 2016, and signed by the Assistant Administrator of the Office of Land and Emergency Management of the U.S. Environmental Protection Agency on October 28, 2016. The Fourth Amendment is attached as Appendix G.

c. “Action Memorandum–5th Amendment” or “Fifth Amendment” shall mean the document titled “Action Memorandum–5th Amendment” transmitted by EPA Region 5 to EPA Headquarters on February 28, 2016, and signed by the Acting Assistant Administrator of the Office of Land and Emergency Management of the U.S. Environmental Protection Agency on March 14, 2017. The Fifth Amendment is attached as Appendix H.

d. “CERCLA” shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675.

e. “Chemours Property” shall mean the property located at 5215 Kennedy Avenue, East Chicago, Indiana. A map showing the Chemours Property is attached as Appendix D.

f. “Day” or “day” shall mean a calendar day. In computing any period of time under this Z2&3 ASAO, where the last day would fall on a Saturday, Sunday, or federal or State holiday, the period shall run until the close of business of the next working day.

g. “Effective Date” shall mean the effective date of this Z2&3 ASAO as provided in Section XXX.

h. “EPA” shall mean the United States Environmental Protection Agency and its successor departments, agencies, or instrumentalities.

i. “EPA Hazardous Substance Superfund” shall mean the Hazardous Substance Superfund established by the Internal Revenue Code, 26 U.S.C. § 9507.

j. “Final List of Z2 Priority Properties” shall mean the list that EPA prepares pursuant to Paragraph 19.b identifying all properties within Zone 2 that are subject to Z2 Exterior Removal Actions funded by the Respondents pursuant to this Z2&3 ASAO.

k. “Final List of Z2&3 Interior Sampling Residences” shall mean the list that EPA prepares pursuant to Paragraph 22.b identifying all residences within Zones 2 and 3 that are subject to Z2&3 Interior Sampling Work funded by the Respondents pursuant to this Z2&3 ASAO.

l. “Final List of Z2&3 Interior Cleaning Residences” shall mean the list that EPA prepares pursuant to Paragraph 26.b identifying all residences within Zone 2 and 3 that are subject to the Z2&3 Interior Cleaning Work funded by the Respondents pursuant to this Z2&3 ASAO.

m. “IDEM” shall mean the Indiana Department of Environmental Management and any successor departments or agencies of the State.

n. “Institutional Controls” or “ICs” shall mean Proprietary Controls and state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls or notices that: (i) limit land, water, or resource use to minimize the potential for human exposure to Waste Material at or in connection with the Site; (ii) limit land, water, or other resource use to implement, ensure non-interference with, or ensure the protectiveness of the Z2 Exterior Removal Actions; and/or (iii) provide information intended to modify or guide human behavior at or in connection with the Site.

o. “Interest” shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year. Rates are available online at <http://www.epa.gov/superfund/superfund-interest-rates>.

p. “National Contingency Plan” or “NCP” shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

q. “OU1” or “Operable Unit 1” shall mean the surface and subsurface soil of the area located inside the red highlighted boundaries on Appendix B. OU1 is generally bounded on the north by East Chicago Avenue; on the east by Parrish Avenue; on the south by East 151st Street/149th Place; and on the west by the Indiana Harbor Canal.

r. “OU2” or “Operable Unit 2” shall mean groundwater associated with the Site as well as the surface soil, subsurface soil, and sediments located inside the blue highlighted boundaries on Appendix B. The area within the blue highlighted boundaries on Appendix B consists of approximately 79 acres, is commonly known as 5300 Kennedy Avenue, and is generally bounded on the north by the Indiana Harbor Belt Railroad; on the east by Kennedy Avenue; on the south and west by the Grand Calumet River; and on the northwest by the Indiana Harbor Canal.

s. “Paragraph” shall mean a portion of this Z2&3 ASAOC identified by an Arabic numeral and shall also mean any Subparagraphs thereof, identified by lower case letters and, in some cases, also Arabic numerals in parenthesis.

t. “Parties” shall mean EPA and the Respondents.

u. “Other Response Costs” shall mean all costs, including but not limited to, direct and indirect costs, that the United States has paid or will pay at or in connection with the Site plus Interest on all such costs, except for Z2&3 ASAOC Response Costs.

v. “Preliminary List of Z2 Priority Properties” shall mean the list of properties in Zone 2 that, as of the Effective Date of this Z2&3 ASAOC, meet criteria (2) and (3) of the definition of “Z2 Priority Properties” set forth in Paragraph 9.qq. The Preliminary List of Z2 Priority Properties is set forth in Appendix E. The addresses are coded to protect Personally Identifiable Information.

w. “Preliminary List of Z2&3 Interior Sampling Residences” shall mean the list of residences in Zones 2 and 3 that, as of the Effective Date of this Z2&3 ASAOC, both (i) meet criterion (2) of the definition of “Z2&3 Interior Sampling Residence” set forth in Paragraph 9.ddd; and (ii) are scheduled by EPA to have the soil associated with the residence cleaned up in 2017. The Preliminary List of Z2&3 Interior Sampling Residences is set forth in Appendix F. The addresses are coded to protect Personally Identifiable Information.

x. “Post-Removal Site Control” shall mean actions necessary to ensure the effectiveness and integrity of the Z2 Exterior Removal Actions to be performed pursuant to this Z2&3 ASAOC consistent with Sections 300.415(l) and 300.5 of the NCP and “Policy on Management of Post-Removal Site Control” (OSWER Directive No. 9360.2-02, Dec. 3, 1990).

y. “Proprietary Controls” shall mean easements or covenants running with the land that: (i) limit land, water, or other resource use and/or provide access rights; and (ii) are created pursuant to common law or statutory law by an instrument that is recorded in the appropriate land records office.

z. “RCRA” shall mean the Solid Waste Disposal Act, 42 U.S.C. §§ 6901–6992 (also known as the Resource Conservation and Recovery Act).

aa. “Record of Decision” or “ROD” shall mean the EPA Record of Decision relating to OU1 of the Site signed on November 30, 2012, by the Director of the Superfund Division, EPA Region 5, and all attachments thereto. The ROD is attached as Appendix I.

bb. “Remedial Action” shall mean the remedial action selected in the ROD.

cc. “Remedial Action Levels” or “RALs” shall mean, for residential properties, 400 parts per million (“ppm”) lead and 26 ppm arsenic and for commercial and industrial properties, 800 ppm lead and 26 ppm arsenic.

dd. “Respondents” shall mean Atlantic Richfield Company, E. I. du Pont de Nemours and Company, The Chemours Company FC, LLC, and United States Metals Refining Company.

ee. “Section” shall mean a portion of this Z2&3 ASAOA identified by a Roman numeral.

ff. “Site” shall mean the U.S. Smelter and Lead Refinery, Inc. Superfund Site, located in the City of East Chicago, Lake County, Indiana, and depicted generally on the map attached as Appendix B. The Site includes both OU1 and OU2.

gg. “State” shall mean the State of Indiana.

hh. “Transfer” shall mean to sell, assign, convey, lease, mortgage, or grant a security interest in, or where used as a noun, a sale, assignment, conveyance, or other disposition of any interest by operation of law or otherwise.

ii. “United States” shall mean the United States of America and each department, agency, and instrumentality of the United States, including EPA.

jj. “USS Lead Z2&3 ASAOA Special Account” shall mean the special account, within the EPA Hazardous Substance Superfund, to be established pursuant to this Z2&3 ASAOA for Zones 2 and 3 of OU1 of the Site by EPA pursuant to Section 122(b)(3) of CERCLA, 42 U.S.C. § 9622(b)(3). This Special Account is associated with Site/Spill ID Number 05 3J.

kk. “Waste Material” shall mean (i) any “hazardous substance” under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), or under Indiana Code 13-11-2-98; (ii) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33), or under Indiana Code 13-11-2-42; (iii) any “solid waste” under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27), or under Indiana Code 13-11-2-205; (iv) any “hazardous material” under Indiana Code 13-11-2-96(b); and (v) any “hazardous waste” under Indiana Code 13-11-2-99(c).

ll. “Z1” or “Zone 1” shall mean the surface and subsurface soil found in an area located inside the yellow highlighted boundaries on Appendix C and labeled as “Zone 1.” Zone 1 is generally bordered: (1) on the north by the northern boundary of the Carrie Gosch Elementary School and a line extending eastward from that boundary to the eastern edge of a north/south utility right of way that runs parallel to McCook Avenue north of East 149th Place;

(2) on the east by: (i) the eastern-most edge of a north/south utility right of way that runs parallel to McCook Avenue until East 149th Place, and (ii) McCook Avenue between East 149th Place and 151st Street; (3) on the south by East 151st Street; and (4) on the west by the Indiana Harbor Canal.

mm. “Z2” or “Zone 2” shall mean the surface and subsurface soil found in an area located inside the yellow highlighted boundaries on Appendix C and labeled as “Zone 2.” Zone 2 is generally bordered: (1) on the north by Chicago Avenue; (2) on the east, by the eastern edge of the railroad right of way that runs principally north and south and is labeled on Appendix C as “Elgin Joliet and Eastern Rlwy”; (3) on the south by East 151st Street; and (4) on the west by: (i) the Indiana Harbor Canal between Chicago Avenue and the northern boundary of the Carrie Gosch Elementary School; (ii) the eastern-most edge of a north/south utility right of way that runs parallel to McCook Avenue until East 149th Place, and (iii) McCook Avenue between East 149th Place and 151st Street.

nn. “Z3” or “Zone 3” shall mean the surface and subsurface soil found in an area located inside the yellow highlighted boundaries on Appendix C and labeled as “Zone 3.” Zone 3 is generally bordered: (1) on the north by Chicago Avenue; (2) on the east by Parrish Avenue; (3) on the south by the northern edge of the railroad right of way located generally to the south of East 149th Place and labeled on Appendix C as “Elgin Joliet and Eastern Rlwy”; and (4) on the west by the eastern edge of the railroad right of way that runs principally north and south and is labeled on Appendix C as “Elgin Joliet and Eastern Rlwy.” The triangular plot of land bounded by several railroad spurs in the southeastern portion of the area labeled Zone 3 on Appendix C is a part of Zone 3.

oo. “Z2 Exterior Design Work” shall mean those activities already undertaken or to be undertaken by EPA, including securing access, to develop final plans and specifications for the cleanup of the soils of Zone 2 properties. EPA has undertaken and will continue to undertake all Z2 Exterior Design Work, including Z2 Exterior Design Work for Z2 Priority Properties, outside the coverage of this Z2&3 ASAOC.

pp. “Z2 Exterior Removal Actions” shall mean removal actions that take place pursuant to this Z2&3 ASAOC after the Effective Date in the yards of Z2 Priority Properties. The Z2 Exterior Removal Actions generally include but are not limited to: (i) excavating soils that exceed the RALs; (ii) backfilling the excavations with clean fill; (iii) implementing, if necessary, Post-Removal Site Controls; (iv) restoring the excavated areas; (v) securing access for the purpose of undertaking activities (i)–(iv); (vi) temporarily storing and managing the Waste Material at the Chemours Property; and (vii) transporting the Waste Material off-site to an appropriate, EPA-permitted, licensed disposal facility.

qq. “Z2 Priority Property” shall mean a property in Zone 2 of OU1 where:

- (1) EPA secures access to implement Z2 Exterior Removal Actions;
- (2) The soil has not previously been remediated to standards that meet the RALs; and

- (3) One or any combination of the following is present:
- i. the top six inches of soil has lead in excess of 1200 ppm and/or arsenic in excess of 68 ppm; and/or
 - ii. a member of a sensitive population (that is, a pregnant woman and/or a child under 7 years of age) lives within a residence located on the property and the top six inches of soil has lead in excess of 400 ppm; and/or
 - iii. one or more children under 7 years of age has/have a blood lead level equal to or greater than 10 micrograms/deciliter (based on venous testing in 2016 or later) and live(s) within a residence located on the property where one or more yards associated with the property qualify(ies) for remediation based on exceeding the 400 ppm RAL for lead.

The Preliminary List of Z2 Priority Properties is set forth in Appendix E. The Final List of Z2 Priority Properties shall be developed by EPA pursuant to Paragraph 19.b.

rr. “Z2 TST&D Plan” shall mean the document developed pursuant to Section 4 of the A2&3 ASAOC SOW and approved by EPA, and any modifications thereto.

ss. “Z2 TST&D Supervising Contractor” or “Zone 2 Temporary Storage, Transportation and Disposal Supervising Contractor” shall mean the principal contractor retained by Respondents to supervise and direct the implementation of the Z2 TST&D Work under this Z2&3 ASAOC.

tt. “Z2 TST&D Work” or “Zone 2 Temporary Storage, Transportation, and Disposal Work” shall mean the TST&D Work required of Respondents in Zone 2 under this Z2&3 ASAOC. The Z2 TST&D Work includes but is not limited to: (i) accepting from EPA, at the Chemours Property, Waste Material that EPA excavates and removes from the yards of the Zone 2 Priority Properties; (ii) implementing dust suppression on and maintenance of the roads used within the Chemours Property for trucks transporting Waste Material; (iii) temporarily storing and managing the Waste Material on the Chemours Property; and (iv) transporting the Waste Material off the Chemours Property to an appropriate, EPA-permitted, licensed disposal facility.

uu. “Z2&3 ASAOC” shall mean this Administrative Settlement Agreement and Order on Consent and all appendices attached hereto (listed in Section XXIX (Integration/Appendices)). In the event of conflict between this Z2&3 ASAOC and any appendix, this Z2&3 ASAOC shall control.

vv. “Z2&3 ASAOC Available Funds” shall mean the funds available in the USS Lead Z2&3 ASAOC Special Account together with any other funds available to EPA to spend on the Z2&3 Removal Actions that originated from the USS Lead Z2&3 ASAOC Special Account. Z2&3 ASAOC Available Funds does not include any money within the EPA Hazardous Substance Superfund apart from the money in or originating from the USS Lead

Z2&3 ASAOC Special Account. Z2&3 ASAOC Available Funds also does not include any funds within the USS Lead Z1&3 Special Account established pursuant to the 2014 Consent Decree or any Z1&3 Available Funds as that term is defined in Paragraph 4.xx of the 2014 Consent Decree.

ww. “Z2&3 Data Management Work” shall mean all activities, after the Effective Date of this Z2&3 ASAOC, undertaken by EPA to develop, manage, and implement proper data management for the data generated by the Z2&3 ASAOC Other Work and the Z2 TST&D Work. The Z2&3 Data Management Work generally includes but is not limited to: (i) coordinating and managing electronic data deliverables; (ii) uploading and managing data in SCRIBE (which is an EPA-developed software program for managing environmental data); (iii) publishing data to a geoplatform viewer; (iv) creating SQL (*i.e.*, Structured Query Language) query views; (v) migrating data to EPA’s Environmental Quality Information System (EQulS) and managing it; (vi) maintaining a Site-specific data management plan; (vii) conducting Quality Assurance/Quality Control (QA/QC) data reviews; (viii) developing applications for data entry, storage, query, visualization, and analysis; and (ix) generating maps and/or other visualization tools that enhance data decision making.

xx. “Z2&3 ASAOC Response Costs” shall mean all costs including, but not limited to, direct and indirect costs, that the United States incurs after the Effective Date of this Z2&3 ASAOC in implementing the Z2&3 ASAOC Other Work (including but not limited to reviewing or developing plans or reports for implementing the Z2&3 ASAOC Other Work), in overseeing implementation of Respondents’ Z2&3 ASAOC Work, in reviewing or developing plans, reports, or other deliverables submitted by Respondents pursuant to this Z2&3 ASAOC, or in otherwise implementing, overseeing, or enforcing this Z2&3 ASAOC. The costs include, but are not limited to, costs associated with this Z2&3 ASAOC and incurred after the Effective Date for payroll, contractors, travel, laboratory, the Department of Justice, costs incurred pursuant to Section IX (Property Requirements) (including, but not limited to, the cost of attorney time and any monies paid to secure or enforce access or land, water, or other resource use restrictions, including but not limited to Institutional Controls and the amount of just compensation), Section XIII (Emergency Response and Notification of Releases), Section XV (Dispute Resolution); Paragraph 85 (Work Takeover), Paragraph 108 (Access to Financial Assurance); and litigation costs associated with this Z2&3 ASAOC. The Z2&3 ASAOC Response Costs do not include Z2 Exterior Design Work, community involvement costs, Agency for Toxic Substances and Disease Registry (ATSDR) costs, costs associated with the operation and maintenance of Remedial Action in Zone 2 or 3 pursuant to the ROD, costs incurred pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c) (sometimes referred to as “5-year remedy reviews”) in Zones 2 or 3, or Other Response Costs.

yy. “Z2&3 ASAOC Other Work” shall mean all activities that EPA performs under this Z2&3 ASAOC. Z2&3 ASAOC Other Work does not include Z2 Exterior Design Work, community involvement actions relating to Zones 2 or 3, Agency for Toxic Substances and Disease Registry (ATSDR) actions relating to Zones 2 or 3, actions associated with the operation and maintenance of Remedial Action in Zones 2 or 3 pursuant to the ROD, or actions undertaken pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c) in Zones 2 or 3. It also does not include any activities that EPA performs in Zone 1 or OU2.

zz. “Z2&3 ASAOC SOW” shall mean the statement of work set forth in Appendix A, and any modifications made thereto in accordance with this Z2&3 ASAOC.

aaa. “Z2&3 ASAOC Work” shall mean all activities and obligations Respondents are required to perform under this Z2&3 ASAOC, except the activities required under Section XI (Retention of Records).

bbb. “Z2&3 Interior Cleaning Residence” shall mean a residence in Zone 2 or Zone 3 where:

- (1) EPA secures access to the interior of the residence to clean;
- (2) The interior of the residence has not previously been cleaned; and
- (3) The results of Z2&3 Interior Sampling Work in one or more areas of the residence reveal lead contamination in excess of 316 ppm and/or arsenic contamination in excess of 26 ppm.

The Final List of Z2&3 Interior Cleaning Residences shall be developed by EPA pursuant to Paragraph 26.b.

ccc. “Z2&3 Interior Cleaning Work” shall mean all activities, after the Effective Date of this Z2&3 ASAOC, undertaken by EPA pursuant to this Z2&3 ASAOC to develop and implement one or more plans for the purpose of cleaning the interior of residences in Zones 2 and/or 3.

ddd. “Z2&3 Interior Sampling Residence” shall mean a residence in Zone 2 or 3 where:

- (1) EPA secures access to the interior of the residence to undertake dust sampling for lead and arsenic and to screen for lead-based paint;
- (2) The interior of the residence has not previously been sampled; and
- (3) The following:
 - i. For a residence in Zone 2, the residence is located on a property that is a Z2 Priority Property and EPA has completed restoration of the excavated areas, except for the 30-day maintenance period, of all yards (there may be a front yard, a back yard, and/or one or more side yards) on the property that require cleanup;
 - ii. For a residence located in Zone 3, soil in one or more of the yards associated with the residence has lead and/or arsenic in concentrations that that qualify the yard(s) for remediation and EPA has completed restoration of the

excavated areas, except for the 30-day maintenance period, of all yard(s) on the property that require cleanup.

The Preliminary List of properties within Zones 2 and 3 that have residences associated with those properties that qualify as Z2&3 Interior Sampling Residences is set forth in Appendix F. The Final List of Z2&3 Interior Sampling Residences shall be developed by EPA pursuant to Paragraph 22.b.

eee. “Z2&3 Interior Sampling Work” shall mean all activities, after the Effective Date of this Z2&3 ASAOC, undertaken by EPA pursuant to this Z2&3 ASAOC to develop and implement one or more plans for the purpose of sampling and screening the interior of residences in Zones 2 and/or 3. The sampling shall include: (i) sampling dust in the interior of a residence for lead and arsenic contamination; and (ii) screening the interior of a residence for the presence of lead-based paint.

fff. “Z2&3 Interior Removal Actions” shall mean the Z2&3 Interior Sampling Work and the Z2&3 Interior Cleaning Work.

ggg. “Z2&3 Removal Actions” shall mean the Z2 Exterior Removal Actions, the Z2&3 Interior Removal Actions, and the Z2&3 Data Management Work.

IV. FINDINGS OF FACT

10. EPA hereby makes the following findings of fact:

a. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List (NPL), set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on April 9, 2009, 74 Fed. Reg. 16,126–34.

b. The Site consists of two Operable Units: OU1 and OU2, both defined above. OU1 has been further divided into three zones: Zone 1 (Z1), Zone 2 (Z2), and Zone 3 (Z3), also defined above.

c. In response to a release or a substantial threat of a release of hazardous substances at or from OU1 of the Site, EPA commenced, in June 2009, a Remedial Investigation and Feasibility Study (RI/FS) of OU1 of the Site pursuant to 40 C.F.R. § 300.430.

d. EPA completed a Remedial Investigation (RI) Report and a Feasibility Study (“FS”) Report of OU1 in June 2012.

e. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the completion of the FS for OU1 and of the proposed plan for remedial action for OU1 on July 12, 2012, in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Director of the Superfund Division, EPA Region 5, based the selection of the response action for OU1.

f. The decision by EPA on the remedial action to be implemented at OU1 of the Site is embodied in a final Record of Decision (ROD), executed on November 30, 2012, on which the State has given its concurrence. The ROD includes a responsiveness summary to the public comments. Notice of the final plan was published in accordance with Section 117(b) of CERCLA, 42 U.S.C. § 9617(b).

g. By Consent Decree entered on October 28, 2014, EPA and certain of the Respondents reached an agreement regarding remedial design and remedial action (RD/RA) in Zones 1 and 3 of OU1 of the Site. RD/RA work under the 2014 Consent Decree commenced in November 2014. In the summer of 2016, EPA suspended RD/RA work in Zone 1 because of a possible change in the intended future use of the properties in Zone 1. EPA is undertaking an Addendum to the FS as it applies to Zone 1. EPA continues RD/RA work in Zone 3 pursuant to the 2014 Consent Decree.

h. In July 2016, outside of the 2014 Consent Decree, EPA began conducting extensive soil sampling within Zone 2 as part of the Remedial Design process for OU1. As of February 7, 2017, EPA had sampled 499 properties in Zone 2 out of approximately 590. 404 of the sampled properties have contamination that equals or exceeds 400 ppm lead and/or 26 ppm arsenic in the top 24 inches of soil. In addition, data from that sampling and information from access agreements revealed that a total of 89 properties had: (1) concentrations in surface soil (0 to 6 inches below ground surface (bgs) at or above 1200 ppm for lead and at or above 68 ppm arsenic; and/or (2) concentrations in surface soil at or above 400 ppm lead where EPA had reason to believe sensitive populations (pregnant women and or children six and under) lived. 17 out of those 89 properties were cleaned up in 2016.

i. Data results from indoor dust sampling that took place in Zone 1 in the summer and fall of 2016 revealed that 110 out of 269 residences within that Zone exceeded EPA's 316 ppm screening level for lead for indoor living spaces. In the fall of 2016, EPA undertook indoor dust sampling in Zones 2 and 3. It compared those results to the indoor screening level of 316 ppm for lead and 26 ppm for arsenic. In Zone 2, 15 of the 30 sampled residences had results that exceeded the screening levels. In Zone 3, 17 of the 36 sampled residences had results that exceeded the screening levels.

j. Lead is a hazardous substance, as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14). The Agency for Toxic Substances and Disease Registry (ATSDR) has determined that exposure to lead presents human health risks. Lead exposure via inhalation and/or ingestion can have detrimental effects on almost every organ and system in the human body. Exposure may occur from direct ingestion of soil in yards, soil tracked indoors (house dust), and inhalation of fugitive dust. Lead can cause a variety of health problems to people who are exposed to it. Potential human receptors include residents, with a particular concern for children six years of age and under and pregnant or nursing women. Children are at greatest risk from the toxic effects of lead. Initially, lead travels in the blood to the soft tissues (heart, liver, kidney, brain, etc.). Then, it gradually redistributes to the bones and teeth where it tends to remain. Children exposed to high levels of lead have exhibited nerve damage, liver damage, colic, anemia, brain damage, and death. The most serious effects associated with markedly elevated blood lead levels include neurotoxic effects such as irreversible brain damage.

k. Arsenic is a hazardous substance, as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14). ATSDR has determined that exposure to arsenic presents human health risks. Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of “pins and needles” in hands and feet. Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small “corns” or “warts” on the palms, soles, and torso. Skin contact with inorganic arsenic may cause redness and swelling. Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen (ATSDR, Chemical Abstract Services [CAS] # 7440-38-2], August 2007).

l. Z2 Exterior Removal Actions. In Action Memorandum–Fourth Amendment, EPA authorized certain removal actions in the yards of properties in Zone 2 of OU1 of the Site that had greater than 1200 ppm lead and/or greater than 68 ppm arsenic in the top six inches of soil.

m. In Action Memorandum–Fifth Amendment, EPA authorized certain removal actions in the yards of the following additional categories of properties in Zone 2: (1) a property where a member of a sensitive population (that is, a pregnant woman and/or a child under 7 years of age) lives within a residence located on the property and the top six inches of soil has lead in excess of 400 ppm; and/or (2) a property where one or more children under 7 years of age has/have a blood lead level equal to or greater than 10 micrograms/deciliter and live(s) within a residence located on the property where the top twenty-four inches of soil has lead in excess of 400 ppm.

n. EPA concluded that the “Z2 Priority Properties,” as defined in Paragraph 9.qq pose greater risks to residents living at those properties. The use of Superfund removal authorities to address this greater risk is consistent with the current Removal Management Levels, the *Superfund Lead-Contaminated Residential Sites Handbook* (August 2003), and Office of Land and Emergency Management Directive 9200.2-167 (December 22, 2016).

o. With respect to the removal actions in the yards of Zone 2, EPA already has implemented and will continue to implement—outside the coverage of this Z2&3 ASAOC—all activities (including sampling) necessary for designing the excavation activities in the yards in Zone 2.

p. By contrast—within the coverage of this Z2&3 ASAOC—EPA’s activities in the yards of Zone 2 will involve excavating contaminated soil; restoring yards; transporting Waste Material to the Chemours Property; securing access; implementing Post-Removal Site Control; and, if necessary, implementing Proprietary and/or Institutional Controls.

q. Respondents’ activities—under this Z2&3 ASAOC with respect to the Zone 2 soil removal activities—involve performing the Z2 TST&D Work. The Z2 TST&D

Work includes accepting from EPA, at the Chemours Property, Waste Material that EPA excavates and removes from the yards of the Zone 2 Priority Properties; implementing dust suppression on and maintenance of the roads used within the Chemours Property for trucks transporting Waste Material; temporarily storing and managing the Waste Material at the Chemours Property; and transporting the Waste Material off of the Chemours Property to an appropriate, EPA-permitted, licensed disposal facility.

r. For purposes of remedial design work, EPA has conducted sampling at 499 properties in Zone 2 and 419 properties in Zone 3. On the basis of that sampling, EPA has determined that the soil in these Zones is relatively shallow and that native sand is relatively close to ground surface or surface grade. In the fall of 2016, EPA performed soil cleanup at 17 residential properties in Zone 2 and 37 residential properties and one park in Zone 3. EPA found contamination below 24 inches bgs that exceeded the RALs at 1 residential property in Zone 2 and 10 residential properties in Zone 3. All the contamination was between 24 and 36 inches bgs, except for the back yard of one Zone 3 property where it extended to 41 inches bgs. EPA determined that would be faster and more cost effective at each of these 11 properties to remove all of the contaminated soil rather than install a visible barrier and make efforts to secure Proprietary and, possibly, Institutional Controls. In the end, EPA estimated that for all 11 properties, the total volume of contaminated soil that it excavated below 24 inches bgs was approximately 113 cubic yards.

s. Z2&3 Interior Removal Actions. The Fourth and Fifth Amendments also authorized certain removal actions in the interior of residences in Zones 2 and 3. The removal actions authorized in the interior of Z2&3 residences include sampling indoor dust for lead and arsenic and screening indoor paint for lead. The Z2&3 residences where this sampling is authorized are those that meet the criteria set forth in the definition of “Z2&3 Interior Sampling Residences” at Paragraph 9.ddd.

t. The removal actions authorized in the interior of Z2&3 residences also includes cleaning the interior of residences that qualify for cleaning by EPA. The Z2&3 residences where this cleaning is authorized are those that meet the criteria set forth in the definition of “Z2&3 Interior Cleaning Residences” in Paragraph 9.bbb.

u. With respect to the Z2&3 Interior Removal Actions, EPA shall be responsible for performing all actions.

v. Respondents shall pay all Z2&3 ASAOC Response Costs not inconsistent with the NCP.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

11. Based on the Findings of Fact set forth above, and the administrative record, EPA has determined that:

a. The U.S. Smelter and Lead Refinery, Inc. Site is a “facility” as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

b. The contamination found at the Site, as identified in the Findings of Fact above, includes “hazardous substances” as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

c. Each Respondent is a “person” as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

d. Each Respondent is a responsible party under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

(1) Respondent Atlantic Richfield Company is the successor to an “owner” and/or “operator,” as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2), of a facility at the time of disposal of hazardous substances at the Site.

(2) Respondent E. I. du Pont de Nemours and Company was the “owner” and/or “operator,” as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2), of a facility at the time of disposal of hazardous substances at the Site.

(3) Respondent The Chemours Company FC, LLC, is (1) the successor to an “owner” and/or “operator,” as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1), of a facility from which there were releases of hazardous substances; and (2) the successor to an “owner” and/or “operator,” as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2), of a facility at the time of disposal of hazardous substances at the Site.

(4) Respondent United States Metals Refining Company was the “owner” and/or “operator,” as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2), of a facility at the time of disposal of hazardous substances at the Site.

e. The conditions described in Paragraphs 10.h–10.k of the Findings of Fact above constitute an actual or threatened “release” of a hazardous substance from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

f. The conditions described in the Fourth and Fifth Amendments may constitute an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance from the facility within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

g. The response actions required by this Z2&3 ASAO are necessary to protect the public health, welfare, or the environment and, if carried out in compliance with the

terms of this Z2&3 ASAOC, will be consistent with the NCP, as provided in Section 300.700(c)(3)(ii) of the NCP.

VI. SETTLEMENT AGREEMENT AND ORDER

12. Based upon the Findings of Fact, Conclusions of Law, and Determinations set forth above, and the administrative record, it is hereby Ordered and Agreed that Respondents shall comply with all provisions of this Z2&3 ASAOC, including, but not limited to, all appendices to this Z2&3 ASAOC and all documents incorporated by reference into this Z2&3 ASAOC.

VII. DESIGNATION OF Z2 TST&D SUPERVISING CONTRACTOR, PROJECT COORDINATOR, AND EPA'S ON-SCENE COORDINATOR

13. Respondents shall retain one or more contractors or subcontractors to perform the Z2 TST&D Work and shall notify EPA of the names, titles, addresses, telephone numbers, email addresses, and qualifications of such contractors or subcontractors within 20 days after the Effective Date. Respondents shall also notify EPA of the names, titles, contact information, and qualifications of any other contractors or subcontractors retained to perform the Z2 TST&D Work at least 10 days prior to commencement of such Z2 TST&D Work. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondents. If EPA disapproves of a selected contractor or subcontractor, Respondents shall retain a different contractor or subcontractor and shall notify EPA of that contractor's or subcontractor's name, title, contact information, and qualifications within 30 days after EPA's disapproval. With respect to any proposed Z2 TST&D Supervising Contractor, Respondents shall demonstrate that the proposed contractor demonstrates compliance with ASQ/ANSI E4:2014 "Quality management systems for environmental information and technology programs – Requirements with guidance for use" (American Society for Quality, February 2014), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, Reissued May 2006) or equivalent documentation as determined by EPA. The qualifications of the persons undertaking the Z2 TST&D Work for Respondents shall be subject to EPA's review for verification based on objective assessment criteria (e.g., experience, capacity, technical expertise) and that they do not have a conflict of interest with respect to the project.

14. Within 10 days after the Effective Date, Respondents shall designate a Project Coordinator who shall be responsible for administration of all actions by Respondents required by this Z2&3 ASAOC and shall submit to EPA the designated Project Coordinator's name, title, address, telephone number, email address, and qualifications. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site work. EPA retains the right to disapprove of the designated Project Coordinator who does not meet the requirements of Paragraph 13. If EPA disapproves of the designated Project Coordinator, Respondents shall retain a different Project Coordinator and shall notify EPA of that person's name, title, contact information, and qualifications within 10 days following EPA's disapproval. Notice or communication relating to this Z2&3 ASAOC from EPA to Respondents' Project Coordinator shall constitute notice or communication to all Respondents.

15. EPA has designated Jacob Hassan, Daniel Haag, and Kristina Behnke of the Region 5 Superfund Division as the On-Scene Coordinators (OSCs). EPA and Respondents, subject to Paragraph 14, shall have the right to change their respective designated OSCs or Project Coordinator. Respondents shall notify EPA 5 days before such a change is made. The initial notification by Respondents may be made orally, but shall be promptly followed by a written notice.

16. The OSCs shall be responsible for overseeing Respondents' implementation of this Z2&3 ASAOC. The OSCs shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any Z2 TST&D Work required by this Z2&3 ASAOC, or to direct any other removal action undertaken at the Site. Absence of the OSCs from the Site shall not be cause for stoppage of work unless specifically directed by one or more of the OSCs.

VIII. Z2&3 ASAOC WORK AND Z2&3 ASAOC OTHER WORK TO BE PERFORMED

A. EPA'S ACTIONS

17. General. To the extent that this Section VIII.A sets forth requirements or limitations on EPA's actions, these requirements or limitations apply only to actions undertaken by EPA using funds provided by the Respondents pursuant to this Z2&3 ASAOC. Nothing in this Section VIII.A or this Z2&3 ASAOC in any way prohibits or prevents EPA from using its own funds at any time for any response actions in Zones 2 and 3.

18. Z2 Exterior Removal Actions: Activities Covered. At each Z2 Priority Property, EPA will implement all Z2 Exterior Removal Actions except for Z2 TST&D Work.

19. Z2 Exterior Removal Actions: Properties Covered

a. EPA will implement Z2 Exterior Removal Actions at only those properties in Zone 2 that meet the definition of "Z2 Priority Property" set forth in Paragraph 9.qq. The final number and identification of the properties that constitute the Z2 Priority Properties will be those that are identified on the "Final List of Z2 Priority Properties" developed pursuant to Paragraph 19.b.

b. Final List of Z2 Priority Properties. By no later than October 15, 2017, EPA will prepare and provide to Respondents' Project Coordinator a draft of the Final List of Z2 Priority Properties. As promptly as possible thereafter, EPA and Respondents' Project Coordinator and/or Respondents will confer. The Parties will endeavor to agree upon the timing of the preparation of the Final List of Z2 Priority Properties. If the Parties cannot agree, the dispute will be resolved in accordance with Section XV (Dispute Resolution) of this Z2&3 ASAOC. EPA will prepare a Final List of Z2 Priority Properties by no later than the time agreed upon in the conference or the date decided upon through the dispute resolution process.

c. Nothing in this Paragraph 19 will preclude Respondents from seeking from EPA, prior to October 15, 2017, a status report on the identification of the properties that, as of the date of the request, qualify as Z2 Priority Properties.

20. Z2 Exterior Removal Actions: Limitations on Timing of Commencing. Notwithstanding the provisions of Paragraph 19, except by consent of Respondents, EPA will not commence any Z2 Exterior Removal Actions on any Z2 Priority Property utilizing funds provided by Respondents under this Z2&3 ASAOC after November 30, 2017.

21. Z2&3 Interior Sampling Work: Activities Covered. At each Z2&3 Interior Sampling Residence, EPA will implement all Z2&3 Interior Sampling Work.

22. Z2&3 Interior Sampling Work: Properties Covered.

a. EPA will implement Z2&3 Interior Sampling Work at only those residences in Zones 2 and 3 that meet the definition of “Z2&3 Interior Sampling Residence” set forth in Paragraph 9.ddd. The final number and identification of the residences that constitute the Z2&3 Interior Sampling Residences will be those identified on the “Final List of Z2&3 Interior Sampling Residences” developed pursuant to Paragraph 22.b.

b. Final List of Z2&3 Interior Sampling Residences. By no later than January 9, 2018, EPA will prepare and provide to Respondents’ Project Coordinator a draft of the Final List of Z2&3 Interior Sampling Residences. As promptly as possible thereafter, EPA and Respondents’ Project Coordinator and/or Respondents will confer. The Parties will endeavor to agree upon the timing of the preparation of the Final List of Z2&3 Interior Sampling Residences. If the Parties cannot agree, the dispute will be resolved in accordance with Section XV (Dispute Resolution) of this Z2&3 ASAOC. EPA will prepare a Final List of Z2&3 Interior Sampling Residences by no later than the time agreed upon in the conference or the date decided upon through the dispute resolution process.

c. Nothing in this Paragraph 22 will preclude Respondents from seeking from EPA, prior to January 9, 2018, a status report on the identification of the properties that, as of the date of the request, qualify as Z2&3 Interior Sampling Residences.

23. Z2&3 Interior Sampling Work: Timing. EPA will use best efforts to schedule and undertake the sampling activities that must occur within the interior of the residence as promptly as possible after the yard restoration activities (excluding the 30 day maintenance period) are completed.

24. Z2&3 Interior Sampling Work: Limitations on Timing of Commencement. Except by consent of the Respondents, EPA will not commence the start of any sampling activities within the interior of a Z2&3 Interior Sampling Residence utilizing funds provided by Respondents under this Z2&3 ASAOC after February 28, 2018; provided, however, that if EPA has commenced sampling activities within the interior of a Z2&3 Interior Sampling Residence on or before February 28, 2018, then EPA may complete all Z2&3 Interior Sampling Work (e.g., submitting the samples to a laboratory for analysis, receiving verified sampling results back from the laboratory, and communicating these results to the resident) at that Z2&3 Interior Sampling Residence with funding provided by the Respondents under this Z2&3 ASAOC.

25. Z2&3 Interior Cleaning Work: Activities Covered.

a. No Lead-Based Paint (LBP). If the interior screening for LBP does not indicate the presence of LBP, EPA will implement all Z2&3 Interior Cleaning Work at the Z2&3 Interior Cleaning Residence.

b. LBP is Present. If the interior screening for LBP indicates the presence of LBP and if lead is the only trigger for the interior cleaning, EPA will implement only one initial cleaning of the residence with funding provided by the Respondents under this Z2&3 ASAOC. EPA will not undertake any re-cleaning of any such a residence with funding provided by the Respondents under this Z2&3 ASAOC.

26. Z2&3 Interior Cleaning Work: Residences Covered.

a. EPA will implement Z2&3 Interior Cleaning Work, or so much of it as is authorized under Paragraph 25, at only those residences in Zones 2 and 3 that meet the definition of “Z2&3 Interior Cleaning Residence” set forth in Paragraph 9.bbb. The final number and identification of the residences that constitute the Z2&3 Interior Cleaning Residences will be those that are identified on the “Final List of Z2&3 Interior Cleaning Residences” developed pursuant to Paragraph 26.b.

b. Final List of Z2&3 Interior Cleaning Residences. By no later than March 31, 2018, EPA will prepare and provide to Respondents’ Project Coordinator a draft of the Final List of Z2&3 Interior Cleaning Residences. As promptly as possible thereafter, EPA and Respondents’ Project Coordinator and/or Respondents will confer. The Parties will endeavor to agree upon the timing of the preparation of the Final List of Z2&3 Interior Cleaning Residences. If the Parties cannot agree, the dispute shall be resolved in accordance with Section XV (Dispute Resolution) of this Z2&3 ASAOC. EPA will prepare a Final List of Z2&3 Interior Cleaning Residences by no later than the time agreed upon in the conference or the date decided upon through the dispute resolution process.

c. Nothing in this Paragraph 26 will preclude Respondents from seeking from EPA, prior to March 31, 2018, a status report on the identification of the properties that, as of the date of the request, qualify as Z2&3 Interior Cleaning Residences.

27. Z2&3 Interior Cleaning Work: Timing. EPA will use best efforts to implement Z2&3 Interior Cleaning Work, or so much of it as is authorized under Paragraph 25, as promptly as possible after receipt of final, verified sampling results for the Z2&3 Interior Cleaning Residence.

28. Z2&3 Interior Cleaning Work: Limitations on Timing of Commencement. Except by consent of the Respondents, EPA will not schedule any Z2&3 Interior Cleaning Work utilizing funds provided by Respondents under this Z2&3 ASAOC after April 30, 2018; provided however, that if EPA has commenced cleaning the interior of a Z2&3 Interior Cleaning Residence on or before April 30, 2018, EPA may then complete all Z2&3 Interior Cleaning Work (e.g., completing the walkthrough, undertaking re-cleaning in areas where the initial cleaning was not effective) at that Z2&3 Interior Cleaning Residence with funding provided by the Respondents under this Z2&3 ASAOC.

B. RESPONDENTS' AGREEMENTS AND ACTIONS

29. Respondents' Agreements regarding Z2 Exterior Removal Actions.

a. Excavation up to 36 Inches bgs for Soils Exceeding the RALs.

Notwithstanding the provisions of the Fourth and Fifth Amendments that limit the excavation of soils exceeding the RALs to a depth of 24 inches bgs and thereafter require the installation of a visible barrier and the implementation of Institutional Controls, Respondents expressly agree that, with respect to the Z2 Exterior Removal Actions at the Z2 Priority Properties, EPA shall have the discretion to: (i) excavate all soils exceeding the RALs until native sand is reached down to a maximum depth of 36 inches bgs; and (ii) not to secure or use best efforts to implement Institutional Controls at any property where it excavates no deeper than 36 inches bgs.

b. Consent Required for Excavation of Soils Exceeding the RALs below 36 inches bgs. Prior to undertaking any excavation of soils exceeding the RALs at depths below 36 inches bgs using funds provided by the Respondents under this Z2&3 ASAOC, EPA shall seek written approval, via email, from Respondents' Project Coordinator. Respondents' Project Coordinator shall respond as promptly as possible and in no event more than 24 hours after receipt of the email from EPA requesting approval. If EPA does not receive a reply from Respondents' Project Coordinator within 24 hours, EPA shall utilize its discretion to determine how to deal with contaminated soils at depths below 36 inches bgs.

c. To the extent that contamination exceeding the RALs is left in place at any depth at any of the Z2 Priority Properties, the provisions of Section IX (Property Requirements) shall apply.

d. To the extent that no contamination exceeding the RALs is left in place at any of the Z2 Priority Properties, EPA shall prepare a Memorandum to the File stating that the Property Requirements of Section IX of this Z2&3 ASAOC are inapplicable and that therefore the property requirements are not a barrier to closing out this Z2&3 ASAOC and issuing a Notice of Completion of the Z2&3 Work pursuant to Paragraph 114 when the conditions of that Paragraph have otherwise been satisfied.

30. Respondents' Actions: General.

a. Respondents shall pay all Z2&3 ASAOC Response Costs not inconsistent with the NCP.

b. Respondents shall implement the Z2 TST&D Work and the other actions required of them pursuant to this A2&3 ASAOC and the Z2&3 ASAOC SOW. Respondents' actions shall be in accordance with the requirements of this Z2&3 ASAOC; the Z2&3 ASAOC SOW; all EPA-approved, conditionally-approved, or modified deliverables required by this Z2&3 ASAOC or the Z2&3 ASAOC SOW; the *National Contingency Plan*; the *Superfund Lead-Contaminated Residential Sites Handbook*, August 2003; and the documents and guidances identified in Section 9 of the Z2&3 ASAOC SOW. Nothing in this Paragraph shall preclude EPA from providing additional guidance under the Resource Conservation and Recovery Act (RCRA) with respect to the Chemours Property, which is subject to a RCRA Section 3008(h)

Corrective Action Administrative Order on Consent, EPA Docket No. 5-RCRA-'97-007. Nothing in this Z2&3 ASAOC limits the authority of the RCRA Corrective Action Project Manager to require sampling or work consistent with the RCRA Section 3008(h) Corrective Action Order at the Chemours Property.

31. Respondents' Actions: Z2 TST&D Plan and Implementation. Pursuant to the schedule set forth in Section 7 of the Z2&3 ASAOC SOW, Respondents shall submit a Z2 TST&D Plan for EPA approval in accordance with the Paragraph 6.6 (Approval of Deliverables) of the Z2&3 ASAOC SOW. Upon approval or approval with modifications of the Z2 TST&D Plan, Respondents shall commence implementation of the Z2 TST&D Work in accordance with the schedule in Section 7 of the Z2&3 ASAOC SOW. Unless otherwise provided in this Z2&3 ASAOC, any additional deliverables that require EPA approval shall be reviewed and approved by EPA in accordance with Paragraph 6.6 (Approval of Deliverables) of the Z2&3 ASAOC SOW.

32. Respondents' Actions: Submission of Deliverables. Respondents shall submit all deliverables required by the Z2&3 ASAOC SOW in accordance with the requirements of Paragraphs 6.3–6.5 of the Z2&3 ASAOC SOW. Respondents shall submit all deliverables other than those required by the Z2&3 ASAOC SOW in accordance with the requirements of Section XXVIII (Notices and Submissions) of this Z2&3 ASAOC.

33. Respondents' Actions: Community Involvement. If requested by EPA, Respondents shall participate in community involvement activities in accordance with Section 2 of the Z2&3 ASAOC SOW.

34. Respondents' Actions: Progress Reports. Respondents shall submit progress reports in accordance with the requirements of Section 5 of the Z2&3 ASAOC SOW.

35. Respondents' Actions: Off-Site Shipments. Respondents shall undertake off-site shipments of Waste Materials in accordance with Paragraph 4.6 of the Z2&3 ASAOC SOW.

36. Respondents' Actions: Certification of Z2 TST&D Work Completion. Pursuant to the schedule set forth in Section 7 of the Z2&3 ASAOC SOW, Respondents shall comply with the requirements of Paragraph 4.7, including the requirement to submit Z2 TST&D Work Completion Report, to secure a certification from EPA of Z2 TST&D Work Completion.

37. For any regulation or guidance referenced in this Z2&3 ASAOC or the Z2&3 ASAOC SOW, the reference will be read to include any subsequent modification, amendment, or replacement of such regulation or guidance. Such modifications, amendments, or replacements apply to the Z2 TST&D Work only after Respondents receive notification from EPA of the modification, amendment, or replacement.

IX. PROPERTY REQUIREMENTS

38. Applicability. This Section applies at all times that contamination exceeding the RALs at any depth is left in place at any Z2 Priority Property.

39. Agreements Regarding Non-Interference; Proprietary Controls. EPA shall use best efforts, where necessary, to secure agreements, enforceable by the United States, providing that the owner of a Z2 Priority Property shall refrain from using his/her property in any manner that EPA determines will: (1) pose an unacceptable risk to human health or to the environment due to exposure to Waste Material; or (2) interfere or adversely affect the implementation, integrity, or protectiveness of the Z2 Exterior Removal Actions. EPA also shall use best efforts to secure Proprietary Controls where necessary, including, if and as necessary, the utilization of courts for orders regarding Proprietary Controls. If and as requested, Respondents shall cooperate with EPA's efforts to secure and ensure compliance with any non-interference agreements and Proprietary Controls.

40. Institutional Controls. If EPA determines that Institutional Controls in the form of state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls or notices are needed, Respondents shall cooperate with EPA's efforts to secure and ensure compliance with such Institutional Controls.

41. All costs incurred by the United States in its efforts to secure non-interference agreements and/or secure, execute and record Proprietary Controls, including the cost of attorney time and the amount of monetary consideration or just compensation paid, constitute Z2&3 ASAOC Response Costs to be reimbursed by Respondents under Section XIV (Payment of Z2&3 ASAOC Response Costs).

42. Notwithstanding any provision of this Z2&3 ASAOC, EPA retains all of its access authorities and rights, as well as all of its rights to require land, water, or other resource use restrictions and Institutional Controls, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statute or regulations.

X. ACCESS TO INFORMATION

43. Respondents shall provide to EPA, upon request, copies of all records, reports, documents, and other information (including records, reports, documents, and other information in electronic form) (hereinafter referred to as "Records") within Respondents' possession or control or that of their contractors or agents relating to the Z2&3 ASAOC Work or to the implementation of this Z2&3 ASAOC, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information regarding the Z2 TST&D Work. Respondents shall also make available to EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Z2 TST&D Work.

44. Privileged and Protected Claims

a. Respondents may assert all or part of a Record requested by EPA is privileged or protected as provided under federal law, in lieu of providing the Record, provided Respondents comply with Paragraph 44.b, and except as provided in Paragraph 44.c.

b. If Respondents assert such a privilege or protection, they shall provide EPA with the following information regarding such Record: its title; its date; the name, title,

affiliation (e.g., company or firm), and address of the author, of each addressee, and of each recipient; a description of the Record's contents; and the privilege or protection asserted. If a claim of privilege or protection applies only to a portion of a Record, Respondents shall provide the Record to EPA in redacted form to mask the privileged or protected portion only.

Respondents shall retain all Records that they claim to be privileged or protected until EPA has had a reasonable opportunity to dispute the privilege or protection claim and any such dispute has been resolved in Respondents' favor.

c. In response to a request from EPA pursuant to Paragraph 43, Respondents may make no claim of privilege or protection regarding: (1) any data regarding the Site, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, radiological, or engineering data, or the portion of any other Record that evidences conditions at or around the Site; or (2) the portion of any Record that Respondents are required to create or generate pursuant to this Z2&3 ASAOC or the Z2&3 ASAOC SOW.

45. **Business Confidential Claims.** Respondents may assert that all or part of a Record provided to EPA under this Section or Section XI (Record Retention) is business confidential to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Respondents shall segregate and clearly identify all Records or parts thereof submitted under this Z2&3 ASAOC for which Respondents assert business confidentiality claims. Records submitted to EPA that Respondents claim to be confidential business information will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies Records when they are submitted to EPA, or if EPA has notified Respondents that the Records are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such Records without further notice to Respondents.

46. Notwithstanding any provision of this Z2&3 ASAOC, EPA retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

XI. RECORD RETENTION

47. Until ten (10) years after EPA provides Respondents with notice, pursuant to Section XXVII (Notice of Completion of Z2&3 ASAOC Work), that all Z2&3 ASAOC Work has been fully performed in accordance with this Z2&3 ASAOC, Respondents shall preserve and retain all non-identical copies of Records (including Records in electronic form) now in their possession or control, or that come into their possession or control, that relate in any manner to their liability under CERCLA with regard to the Site, provided, however, that Respondents who are potentially liable as owners or operators of the Site must retain, in addition, all Records that relate to the liability of any other person under CERCLA with respect to the Site. Each Respondent must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above all non-identical copies of the last draft or final version of any Records (including Records in electronic form) now in their possession or control or that come into their possession or control that relate in any manner to the performance of the Z2&3 ASAOC Work, provided, however, that each Respondent (and its contractors and agents) must retain, in addition, copies of all data generated during the performance of the Z2&3 ASAOC

Work and not contained in the aforementioned Records required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

48. At the conclusion of the document retention period, Respondents shall notify EPA at least 90 days prior to the destruction of any such Records, and, upon request by EPA, and except as provided in Paragraph 44 (Privileged and Protected Claims), Respondents shall deliver any such Records to EPA .

49. Each Respondent certifies individually that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed, or otherwise disposed of any Records (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by EPA and that it has fully complied with any and all EPA requests for information regarding the Site pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XII. COMPLIANCE WITH OTHER LAWS

50. Nothing in this Z2&3 ASAOC limits Respondents' obligations to comply with the requirements of all applicable state and federal laws and regulations, except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and 40 C.F.R. §§ 300.400(e) and 300.415(j). In accordance with 40 C.F.R. § 300.415(j), all on-site actions required pursuant to this Z2&3 ASAOC shall, to the extent practicable, as determined by EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (ARARs) under federal environmental or state environmental or facility siting laws.

51. No local, state, or federal permit shall be required for any portion of the Z2 TST&D Work conducted entirely on-site, including at the Chemours Property (which is in very close proximity to the contamination and necessary for implementation of the Z2&3 ASAOC Work and therefore has been determined to be "on-site" for the purposes of the performance of the activities under the 2014 Consent Decree and this Z2&3 ASAOC), including studies, if the action is selected and carried out in compliance with Section 121 of CERCLA, 42 U.S.C. § 9621. Where any portion of the Z2 TST&D Work that is not on-site requires a federal or state permit or approval, Respondents shall submit timely and complete applications and take all other actions necessary to obtain and to comply with all such permits or approvals. Respondents may seek relief under the provisions of Section XVI (Force Majeure) for any delay in the performance of the Z2 TST&D Work resulting from a failure to obtain, or a delay in obtaining, any permit or approval required for the Z2 TST&D Work, provided that they have submitted timely and complete applications and taken all other actions necessary to obtain all such permits or approvals. This Z2&3 ASAOC is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

XIII. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

52. Emergency Response. Respondents shall comply with the requirements of Paragraph 4.5(a) of the Z2&3 ASAOC SOW if any event occurs during performance of the Z2 TST&D Work that causes or threatens to cause a release of Waste Material on, at, or from the

Site that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment. In the event that Respondents fail to take appropriate response action, and EPA takes such action instead, Respondents shall reimburse EPA for all costs of such response action not inconsistent with the NCP pursuant to Section XIV (Payment of Z2&3 ASAO Response Costs).

53. Release Reporting. Upon the occurrence of any event during performance of the Work that Respondents are required to report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004, Respondents shall comply with the requirements of Paragraphs 4.5(b)–(e) of the Z2&3 ASAO SOW.

XIV. PAYMENT OF Z2&3 ASAO RESPONSE COSTS

54. Payments by Respondents for Z2&3 ASAO Response Costs. Respondents shall pay to EPA all Z2&3 ASAO Response Costs not inconsistent with the NCP.

55. Deposit Information and Payment Instructions. Respondents shall make all payments required by this Section and Section XVII (Stipulated Penalties) by Fedwire Electronic Funds Transfer (EFT) to:

Federal Reserve Bank of New York
ABA = 021030004
Account = 68010727
SWIFT address = FRNYUS33
33 Liberty Street
New York, NY 10045
Field Tag 4200 of the Fedwire message should read “D 68010727 Environmental Protection Agency”

The Fedwire EFT shall expressly state: (i) the Site/Spill ID Number of 05 3J, (ii) the EPA Docket Number for this action, and (iii) that the funds are for the USS Lead Z2&3 ASAO Special Account and not the USS Lead Z1&3 Special Account.

56. Fixed Prepayments of Certain Z2&3 ASAO Response Costs.

a. First Payment. Respondents shall pay \$5 million by no later than 7 days after the Effective Date of this Z2&3 ASAO.

b. Second Payment. Respondents shall pay \$2.25 million by no later than 14 days after receiving notice, by certified mail, that the Z2&3 Available Funds are below \$1.5 million.

c. Third Payment. After making the payment pursuant to Paragraph 56.b, Respondents shall pay \$2.25 million by no later than 14 days after receiving notice, by certified mail, that the Z2&3 Available Funds are below \$1 million.

57. Additional Prepayments of Certain Z2&3 ASAOE Response Costs Based on Projected Shortfalls to Complete the Z2&3 ASAOE Other Work.

a. Definition. For purposes of this Paragraph 57, the term “Z2&3 Removal Actions Cost Completion Projection” shall mean the sum of (i) any direct costs (*e.g.*, extramural costs plus intramural costs, such as payroll and travel costs) that EPA has incurred for the Z2&3 Removal Actions as of the date of the Projection but which have not been paid for with Z2&3 ASAOE Available Funds *plus* (ii) EPA’s projection of the direct costs that it expects to incur, as of the date of the Projection, to complete the Z2&3 Removal Actions.

b. Notification of Projected Shortfall and Payment Amount. If, at any time after receipt of the payments required in Paragraph 56, the Z2&3 Available Funds fall below \$1 million, EPA will notify Respondents and include in the notification: (i) a Z2&3 Removal Actions Cost Completion Projection, (ii) the amount of Z2&3 Available Funds, and (iii) a bill for payment that shall be calculated using the following equation:

$$\text{Payment} = (\text{Z2\&3 Removal Actions Cost Completion Projection} - \text{Z2\&3 Available Funds}) + \$1,000,000$$

c. Payments by Respondents. By no later than 14 days after receiving a notice, by certified mail, from EPA pursuant to Paragraph 57.b, Respondents shall pay the bill included in the notice. Respondents shall not contest any bill sent under this Paragraph 57 at the time it is sent. Instead, at the time EPA sends the bill under Paragraph 58, Respondents, in accordance with the requirements and limitations of Paragraph 61, may object to Z2&3 ASAOE Response Costs that were paid through funds provided under this Paragraph 57.

d. Nothing in this Paragraph 57 shall limit EPA’s ability to demand a payment under Paragraph 57.b more than one time.

e. In its unreviewable discretion, EPA may elect to demand a payment under Paragraph 57.b that is calculated using less than \$1,000,000 as the value added at the end of the payment equation.

58. Z2&3 ASAOE Response Costs Payment with Accounting Statement. After EPA has concluded that all phases of the Z2&3 ASAOE Work and the Z2&3 ASAOE Other Work is complete, including any actions required under Section IX (Property Requirements) but except for the payment of any amounts due under Paragraph 59, EPA will prepare an accounting of Z2&3 ASAOE Response Costs. The accounting will include an Itemized Cost Summary of all Z2&3 ASAOE Response Costs, including direct and indirect costs, that EPA has incurred. In the accounting, EPA will identify Respondents’ prepayment(s) under Paragraphs 56 and 57, not including Interest on those payments, as a “collection” and this collection shall serve as a credit toward Z2&3 ASAOE Response Costs. EPA will send a bill, by certified mail, to Respondents for the remaining, outstanding Z2&3 ASAOE Response Costs, including Interest on indirect costs (“Remaining, Outstanding Z2&3 ASAOE Response Costs”). Respondents shall pay the bill within 60 days after receipt except as otherwise provided in Paragraph 61.

59. Periodic Billing or Withdrawal from the Z2&3 ASAOE Special Account for any Z2&3 ASAOE Response Costs Not Previously Billed.

a. After receipt of the payment in Paragraph 58, to the extent that EPA incurs any Z2&3 ASAOE Response Costs, EPA will prepare a statement that includes an Itemized Cost Summary of all Z2&3 ASAOE Response Costs (which includes direct and indirect costs incurred by EPA, its contractors, and DOJ) which shall show, *inter alia*, all Z2&3 ASAOE Response Costs that EPA has not included in any previous bill.

b. If funds still exist in the USS Lead Z2&3 ASAOE Special Account to pay these additional Z2&3 ASAOE Response Costs, EPA will include in the statement to Respondents an intent to utilize, from the USS Lead Z2&3 Special Account an amount equal to the amount owed, consistent with the hierarchy of the use of funds in the Z2&3 Special Account set forth in Paragraph 60. EPA shall not undertake that utilization of funds until Respondents have had the opportunity to make an objection pursuant to Paragraph 61. If Respondents do not make an objection, EPA shall undertake the utilization.

c. If funds do not still exist in the Z2&3 ASAOE Special Account to cover the amount owed, the statement will include a bill requiring payment. Respondents shall pay the bill within 60 days after receipt except as otherwise provided in Paragraph 61.

60. Deposit of Z2&3 ASAOE Response Costs. Each payment made by Respondents pursuant to Paragraphs 56 through 59 shall be deposited by EPA in the USS Lead Z2&3 ASAOE Special Account, which is associated with Site/Spill ID Number 05 3J. These funds shall be retained and used by EPA:

a. First, to conduct or finance its activities under this Z2&3 ASAOE, including activities, if any, associated with Section IX (Property Requirements);

b. Second, to conduct or finance other future response actions at the Site, but only after: (1) EPA has demanded, and Respondents have paid, any bill due under Paragraph 58 (as originally sent or as determined to be due as provided in Paragraph 61); and (2) EPA has issued, pursuant to Section XXVII, a Notice of Completion of Z2&3 ASAOE Work (including, if any, work relating to property requirements under Section IX).

c. Third, to reimburse itself for any other costs at or in connection with the Site not yet reimbursed after *all* anticipated response actions at the Site are complete, but only after: (1) EPA has demanded, and Respondents have paid, any bill due under Paragraph 58 (as originally sent or as determined to be due as provided in Paragraph 61); and (2) EPA has issued, pursuant to Section XXVII, a Notice of Completion of Z2&3 ASAOE Work (including, if any, work relating to property requirements under Section IX).

Only if funds remain after payment under Items (a)–(c) may EPA transfer any balance in the USS Z2&3 ASAOE Special Account to the EPA Hazardous Substance Superfund.

61. Objecting to Payments.

a. Basis for Objections.

(1) Respondents may contest Z2&3 ASAO Response Costs that are direct costs if Respondents determine that EPA has made a mathematical error or included a cost item that is not within the definition of Z2&3 ASAO Response Costs or if they believe that EPA incurred excess costs as a direct result of an EPA action that was inconsistent with a specific provision or provisions of the NCP.

(2) Respondents may contest Z2&3 ASAO Response Costs that are indirect costs if Respondents determine that EPA has made a mathematical error. Respondents shall not contest the methodology that EPA uses to determine its indirect cost rate or the value of EPA's indirect rate(s) for the applicable years. The only basis for an objection to indirect costs is a mathematical error.

b. Timing and Manner of Objection

(1) Timing. For payments required under Paragraphs 56–58, Respondents shall make any objection only within 60 days after receipt of the accounting under Paragraph 58. For payments required under Paragraph 59, Respondents shall make any objection within 60 days after receipt of a statement indicating withdrawals from the USS Lead Z2&3 Special Account or a bill.

(2) Manner. Any objection must be sent to EPA in accordance with Section XXVIII (Notices) and shall specifically identify the contested Z2&3 ASAO Response Cost and the basis for the objection.

c. Establishment of Escrow Account for Contested Costs and Payment of Uncontested Costs.

(1) In the event of an objection, Respondents shall establish, in a duly chartered bank or trust company, an interest-bearing escrow account that is insured by the Federal Deposit Insurance Corporation ("FDIC"), and remit to that escrow account funds equivalent to the amount of the contested Z21&3 ASAO Response Costs ("Escrowed Funds"). Respondents shall send to EPA, as provided in Section XXVIII (Notices), a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account.

(2) Simultaneously with the establishment of the escrow account, Respondents shall pay: (i) with respect to a bill sent under Paragraph 58, the Remaining, Outstanding Z2&3 Future Response Costs minus the Escrowed Funds; (ii) with respect to a bill sent under Paragraph 59, the uncontested Z2&3 ASAO Response Costs. Respondents shall send to EPA, as provided in

Section XXVIII (Notices), a transmittal letter identifying the payments made under this Paragraph 61.c.(2).

d. Dispute Resolution. Simultaneously with establishment of the escrow account, Respondents shall initiate the Dispute Resolution procedures in Section XV (Dispute Resolution). If EPA prevails in the dispute, Respondents shall pay the sums due (with accrued interest in the escrow account) to the EPA within five days after the resolution of the dispute. If Respondents prevail concerning any aspect of the contested costs, Respondents shall pay that portion of the costs (plus associated accrued interest in the escrow account) for which they did not prevail to EPA within five days after the resolution of the dispute. Respondents shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XV (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Respondents' obligation to reimburse EPA for the Z2&3 ASAOC Response Costs.

62. In the event that any payment for Z2&3 ASAOC Response Costs required under this Section is not made by the date required, Respondents shall pay Interest on the unpaid balance. Notwithstanding the foregoing, Respondents shall not be required to pay Interest on amounts deposited in an escrow account in accordance with Paragraph 61.c other than the interest earned by the account. The Interest on the prepayment of the Z2&3 ASAOC Response Costs due under Paragraph 56 shall begin to accrue on the due date of that payment. The Interest on all other payments due under this Section shall begin to accrue on the date of the bill. The Interest shall accrue through the date of Respondents' payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to EPA by virtue of Respondents' failure to make timely payments under this Section including, but not limited to, payment of stipulated penalties pursuant to Paragraph 73.

XV. DISPUTE RESOLUTION

63. Unless otherwise expressly provided for in this Z2&3 ASAOC, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Z2&3 ASAOC. The Parties shall attempt to resolve any disagreements concerning this Z2&3 ASAOC expeditiously and informally.

64. Informal Dispute Resolution.

a. For Disputes under Paragraph 61. If Respondents object to any action of EPA under Section XIV (Payments of Z2&3 ASAOC Response Costs), they shall send EPA a written Notice of Dispute describing the objection(s) at the same time that they are required to make the objection(s) under Paragraph 61.b(1). EPA and Respondents shall have 60 days from EPA's receipt of Respondents' Notice of Dispute to resolve the dispute through informal negotiations (the "Payment-Dispute Negotiation Period").

b. For all Disputes other than those under Paragraph 61. If Respondents object to any action of EPA other than actions under Section XIV (Payments of Z2&3 ASAOC Response Costs), they shall send EPA a written Notice of Dispute describing the objection(s) within 14 days after such action. EPA and Respondents shall have 30 days from EPA's receipt

of Respondents' Notice of Dispute to resolve the dispute through informal negotiations (the "Non-Payment Dispute Negotiation Period").

c. The Payment-Dispute Negotiation Period and the Non-Payment-Dispute Negotiation Period may be extended at the sole discretion of EPA. Any agreement reached by the Parties pursuant to this Section shall be in writing and shall, upon signature by the Parties, be incorporated into and become an enforceable part of this Z2&3 ASAOC.

65. **Formal Dispute Resolution.**

a. For Disputes under Paragraph 61. If the Parties are unable to reach an agreement within the Payment-Dispute Negotiation Period, Respondents shall, within 60 days after the end of the Payment-Dispute Negotiation Period, submit a statement of position to the OSC. Within 60 days thereafter, EPA shall submit a statement of position.

b. For all Disputes other than those under Paragraph 61. If the Parties are unable to reach an agreement within the Non-Payment-Dispute Negotiation Period, Respondents shall, within 30 days after the end of the Non-Payment-Dispute Negotiation Period, submit a statement of position to the OSC. Within 30 days thereafter, EPA shall submit a statement of position.

c. Thereafter, for all types of disputes, the Region 5 Superfund Division Director will issue a written decision on the dispute to Respondents. EPA's decision shall be incorporated into and become an enforceable part of this Z2&3 ASAOC. Respondents shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with EPA's decision, whichever occurs.

66. Except as provided in Paragraph 61 (Objecting to Payments) or as agreed by EPA, the invocation of formal dispute resolution procedures under this Section does not extend, postpone, or affect in any way any obligation of Respondents under this Z2&3 ASAOC. Except as provided in Paragraph 77, stipulated penalties with respect to the disputed matter shall continue to accrue, but payment shall be stayed pending resolution of the dispute. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Z2&3 ASAOC. In the event that Respondents do not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XVII (Stipulated Penalties).

XVI. FORCE MAJEURE

67. "Force Majeure" for purposes of this Z2&3 ASAOC, is defined as any event arising from causes beyond the control of Respondents, of any entity controlled by Respondents, or of Respondents' contractors that delays or prevents the performance of any obligation under this Z2&3 ASAOC despite Respondents' best efforts to fulfill the obligation. The requirement that Respondents exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure (a) as it is occurring and (b) following the potential force majeure such that the delay and any adverse effects of the delay are minimized to the greatest extent possible. "Force

majeure” does not include financial inability to complete the Z2&3 ASAOC Work, or any increased cost of performance.

68. If any event occurs or has occurred that may delay the performance of any obligation under this Z2&3 ASAOC for which Respondents intend or may intend to assert a claim of force majeure, Respondents shall notify EPA’s OSC orally or, in his or her absence, the alternate EPA OSC, or, in the event both of EPA’s designated representatives are unavailable, the Director of the Waste Management Division, EPA Region 5 within 3 days of when Respondents first knew that the event might cause a delay. Within 7 days thereafter, Respondents shall provide in writing to EPA an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondents’ rationale for attributing such delay to a force majeure; and a statement as to whether, in the opinion of Respondents, such event may cause or contribute to an endangerment to public health or welfare, or the environment. Respondents shall include with any notice all available documentation supporting their claim that the delay was attributable to a force majeure. Respondents shall be deemed to know of any circumstance of which Respondents, any entity controlled by Respondents, or Respondents’ contractors knew or should have known. Failure to comply with the above requirements regarding an event shall preclude Respondents from asserting any claim of force majeure regarding that event, provided, however, that if EPA, despite the late or incomplete notice, is able to assess to its satisfaction whether the event is a force majeure under Paragraph 67 and whether Respondents have exercised their best efforts under Paragraph 67, EPA may, in its unreviewable discretion, excuse in writing Respondents’ failure to submit timely or complete notices under this Paragraph.

69. If EPA agrees that the delay or anticipated delay is attributable to a force majeure, the time for performance of the obligations under this Z2&3 ASAOC that are affected by the force majeure will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure, EPA will notify Respondents in writing of its decision. If EPA agrees that the delay is attributable to a force majeure, EPA will notify Respondents in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure.

70. If Respondents elect to invoke the dispute resolution procedures set forth in Section XV (Dispute Resolution), they shall do so no later than 15 days after receipt of EPA’s notice. In any such proceeding, Respondents shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Respondents complied with the requirements of Paragraphs 67 and 68. If Respondents carry this burden, the delay at issue shall be deemed not to be a violation by Respondents of the affected obligation of this Z2&3 ASAOC identified to EPA.

71. The failure by EPA to timely complete any obligation under the Z2&3 ASAOC is not a violation of the Z2&3 ASAOC, provided, however, that if such failure prevents

Respondents from meeting one or more deadlines under the Z2&3 ASAO, Respondents may seek relief under this Section.

XVII. STIPULATED PENALTIES

72. Respondents shall be liable to EPA for stipulated penalties in the amounts set forth in Paragraphs 73.a and 74 for failure to comply with the obligations specified in Paragraphs 73.b and 74, unless excused under Section XVI (Force Majeure). “Comply” as used in the previous sentence includes compliance by Respondents with all applicable requirements of this Z2&3 ASAO and the Z2&3 ASAO SOW, within the deadlines established under this Z2&3 ASAO and the Z2&3 ASAO SOW.

73. **Stipulated Penalty Amounts: Payments, Financial Assurance, Major Deliverables, and Other Milestones**

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 73.b:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$ 2,500	1st through 14th day
\$ 5,000	15th through 30th day
\$ 10,000	31st day and beyond

b. **Obligations**

(1) Payment of any amount due under Section XIV (Payment of Z2&3 ASAO Response Costs).

(2) Establishment and maintenance of financial assurance in accordance with Section XXV (Financial Assurance).

(3) Establishment of an escrow account to hold any disputed Z2&3 ASAO Response Costs under Paragraph 61 (Objecting to Payments).

(4) Compliance with and implementation of the approved Z2 TST&D Plan in accordance with the terms of the Plan;

(5) Compliance with each of the requirements for Off-Site Waste Material Shipments set forth in Paragraph 4.6 of the Z2&3 ASAO SOW.

74. **Stipulated Penalty Amounts – Other Deliverables.** The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate deliverables pursuant to this Z2&3 ASAO, other than those specified in Paragraph 73.b:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$ 2,000	1st through 14th day
\$ 5,000	15th through 30th day
\$ 7,500	31st day and beyond

75. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 85 (Z2 TST&D Work Takeover), Respondents shall be liable for a stipulated penalty in the amount of \$1 million. Stipulated penalties under this Paragraph are in addition to the remedies available to EPA under Paragraphs 85 (Work Takeover) and 108 (Access to Financial Assurance).

76. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. Penalties shall continue to accrue during any dispute resolution period, and shall be paid within 15 days after the agreement or the receipt of EPA's decision or order. However, stipulated penalties shall not accrue: (a) with respect to a deficient submission under Paragraph 31, during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Respondents of any deficiency; and (b) with respect to a decision by Region 5 Superfund Division Director under Paragraph 65 (Formal Dispute Resolution), during the period, if any, beginning on the 21st day after the Negotiation Period begins until the date that the Region 5 Superfund Division Director issues a final decision regarding such dispute. Nothing in this Z2&3 ASAOC shall prevent the simultaneous accrual of separate penalties for separate violations of this Z2&3 ASAOC.

77. Following EPA's determination that Respondents have failed to comply with a requirement of this Z2&3 ASAOC, EPA may give Respondents written notification of the failure and describe the noncompliance. EPA may send Respondents a written demand for payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Respondents of a violation.

78. All penalties accruing under this Section shall be due and payable to EPA within 30 days after Respondents' receipt from EPA of a demand for payment of the penalties, unless Respondents invoke the Dispute Resolution procedures under Section XV (Dispute Resolution) within the 30-day period. All payments to EPA under this Section shall indicate that the payment is for stipulated penalties and shall be made in accordance with Paragraph 55 (Deposit Information and Payment Instructions).

79. If Respondents fail to pay stipulated penalties when due, Respondents shall pay Interest on the unpaid stipulated penalties as follows: (a) if Respondents have timely invoked dispute resolution such that the obligation to pay stipulated penalties has been stayed pending the outcome of dispute resolution, Interest shall accrue from the date stipulated penalties are due pursuant to Paragraph 76 until the date of payment; and (b) if Respondents fail to timely invoke dispute resolution, Interest shall accrue from the date of demand under Paragraph 78 until the date of payment. If Respondents fail to pay stipulated penalties and Interest when due, the United States may institute proceedings to collect the penalties and Interest.

80. The payment of penalties and Interest, if any, shall not alter in any way Respondents' obligation to complete the performance of the Z2&3 ASAO Work required under this Z2&3 ASAO.

81. Nothing in this Z2&3 ASAO shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of Respondents' violation of this Z2&3 ASAO or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Sections 106(b) and 122(l) of CERCLA, 42 U.S.C. §§ 9606(b) and 9622(l), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), provided however, that EPA shall not seek civil penalties pursuant to Section 106(b) or Section 122(l) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided in this Z2&3 ASAO, except in the case of a willful violation of this Z2&3 ASAO or in the event that EPA assumes performance of a portion or all of the Z2 TST&D Work pursuant to Paragraph 85 (Z2 TST&D Work Takeover).

XVIII. COVENANTS BY EPA

82. Except as provided in Section XIX (Reservations of Rights by EPA), EPA covenants not to sue or to take administrative action against Respondents pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for the Z2&3 ASAO Work, the Z2&3 ASAO Other Work, and the Z2&3 ASAO Response Costs. These covenants shall take effect upon the Effective Date. These covenants are conditioned upon the complete and satisfactory performance by Respondents of their obligations under this Z2&3 ASAO. These covenants extend only to Respondents and do not extend to any other person.

XIX. RESERVATIONS OF RIGHTS BY EPA

83. Except as specifically provided in this Z2&3 ASAO, nothing in this Z2&3 ASAO shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing in this Z2&3 ASAO shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Z2&3 ASAO, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law.

84. The covenants set forth in Section XVIII (Covenants by EPA) do not pertain to any matters other than those expressly identified therein. EPA reserves, and this Z2&3 ASAO is without prejudice to, all rights against Respondents with respect to all other matters, including, but not limited to:

- a. liability for failure by Respondents to meet a requirement of this Z2&3 ASAO;
- b. liability for costs not included within the definition of Z2&3 ASAO Response Costs;

c. liability for performance of response actions other than the Z2&3 ASAOC Work and the Z2&3 ASAOC Other Work;

d. criminal liability;

e. liability for violations of federal or state law that occur during or after implementation of the Z2&3 ASAOC Work;

f. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

g. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Site; and

h. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site;

85. Z2 TST&D Work Takeover

a. In the event EPA determines that Respondents: (1) have ceased implementation of any portion of the Z2 TST&D Work; (2) are seriously or repeatedly deficient or late in their performance of the Z2 TST&D Work; or (3) are implementing the Z2 TST&D Work in a manner that may cause an endangerment to human health or the environment, EPA may issue a written notice ("Z2 TST&D Work Takeover Notice") to Respondents. Any Z2 TST&D Work Takeover Notice issued by EPA (which writing may be electronic) will specify the grounds upon which such notice was issued and will provide Respondents a period of 10 days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

b. If, after expiration of the 10-day notice period specified in Paragraph 85.a, Respondents have not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the relevant Z2 TST&D Work Takeover Notice, EPA may at any time thereafter assume the performance of all or any portion(s) of the Z2 TST&D Work as EPA deems necessary ("Z2 TST&D Work Takeover"). EPA will notify Respondents in writing (which writing may be electronic) if EPA determines that implementation of a Z2 TST&D Work Takeover is warranted under this Paragraph 85.b. Funding of Z2 TST&D Work Takeover costs is addressed under Paragraph 108 (Access to Financial Assurance).

c. Respondents may invoke the procedures set forth in Paragraph 65 (Formal Dispute Resolution) to dispute EPA's implementation of a Z2 TST&D Work Takeover under Paragraph 85.b. However, notwithstanding Respondents' invocation of such dispute resolution procedures, and during the pendency of any such dispute, EPA may in its sole discretion commence and continue a Z2 TST&D Work Takeover under Paragraph 85.b until the earlier of (1) the date that Respondents remedy, to EPA's satisfaction, the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, or (2) the date that a written decision terminating such Z2 TST&D Work Takeover is rendered in accordance with Paragraph 65 (Formal Dispute Resolution).

d. Notwithstanding any other provision of this Z2&3 ASAO, EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XX. COVENANTS BY RESPONDENTS

86. Respondents covenant not to sue and agree not to assert any claims or causes of action against the United States, or its contractors or employees, with respect to the Z2&3 ASAO Work, the Z2&3 ASAO Other Work Z2&3 ASAO Response Costs, and this Z2&3 ASAO, including, but not limited to:

a. any direct or indirect claim for reimbursement from the EPA Hazardous Substance Superfund through Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;

b. any claims under Sections 107 and 113 of CERCLA, Section 7002(a) of RCRA, 42 U.S.C. § 6972(a), or state law regarding the Z2&3 ASAO Work, the Z2&3 ASAO Other Work Z2&3 ASAO Response Costs, and this Z2&3 ASAO; or

c. any claim arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the State Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, or at common law.

87. Except as provided in Paragraph 90 (Waiver of Claims by Respondents), these covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to any of the reservations set forth in Section XIX (Reservations of Rights by EPA), other than in Paragraph 84.a (liability for failure to meet a requirement of the Z2&3 ASAO), 84.d (criminal liability), or 84.e (violations of federal/state law during or after implementation of the Work), but only to the extent that Respondents' claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

88. Nothing in this Z2&3 ASAO shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

89. Respondents reserve, and this Z2&3 ASAO is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, and brought pursuant to any statute other than CERCLA or RCRA and for which the waiver of sovereign immunity is found in a statute other than CERCLA or RCRA, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States, as that term is defined in 28 U.S.C. § 2671, while acting within the scope of his or her office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, the foregoing shall not include any claim based on EPA's selection of response actions, or the oversight or approval of Respondents' deliverables or activities.

90. Waiver of Claims by Respondents.

a. Respondents agree not to assert any claims and to waive all claims or causes of action (including but not limited to claims or causes of action under Sections 107(a) and 113 of CERCLA) that they may have:

(1) De Micromis Waiver. For all matters relating to the Site against any person where the person's liability to Respondents with respect to the Site is based solely on having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances at the Site, if all or part of the disposal, treatment, or transport occurred before April 1, 2001, and the total amount of material containing hazardous substances contributed by such person to the Site was less than 110 gallons of liquid materials or 200 pounds of solid materials.

(2) De Minimis/Ability to Pay Waiver. For Z2&3 ASAOC Response Costs against any person that in the future, with respect to the Site, enters into a final Section 122(g) *de minimis* settlement with EPA or a final settlement based on limited ability to pay.

b. Exceptions to Waivers.

(1) The waivers under this Paragraph 90 shall not apply with respect to any defense, claim, or cause of action that a Respondent may have against any person otherwise covered by such waivers if such person asserts a claim or cause of action relating to the Site against such Respondent.

(2) The waiver under Paragraph 90.a(1) (De Micromis Waiver) shall not apply to any claim or cause of action against any person otherwise covered by such waiver if EPA determines that: (i) the materials containing hazardous substances contributed to the Site by such person contributed significantly or could contribute significantly, either individually or in the aggregate, to the cost of the response action or natural resource restoration at the Site; or (ii) such person has failed to comply with any information request or administrative subpoena issued pursuant to Section 104(e) or 122(e) of CERCLA, 42 U.S.C. § 9604(e) or 9622(e), or Section 3007 of RCRA, 42 U.S.C. § 6927, or has impeded or is impeding, through action or inaction, the performance of a response action or natural resource restoration with respect to the Site; or if (iii) such person has been convicted of a criminal violation for the conduct to which the waiver would apply and that conviction has not been vitiated on appeal or otherwise.

XXI. OTHER CLAIMS

91. By issuance of this Z2&3 ASAOC, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States or EPA shall not be deemed a party to any contract entered into

by Respondents or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Z2&3 ASAO.

92. Except as expressly provided in Paragraphs 90 (Waiver of Claims by Respondents) and Section XVIII (Covenants by EPA), nothing in this Z2&3 ASAO constitutes a satisfaction of or release from any claim or cause of action against Respondents or any person not a party to this Z2&3 ASAO, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the United States for costs, damages, and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.

93. No action or decision by EPA pursuant to this Z2&3 ASAO shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h)

XXII. EFFECT OF SETTLEMENT/CONTRIBUTION

94. Except as provided in Paragraphs 90 (Waiver of Claims by Respondents), nothing in this Z2&3 ASAO shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Z2&3 ASAO. Except as provided in Section XX (Covenants by Respondents), each of the Parties expressly reserves any and all rights (including, but not limited to, pursuant to Section 113 of CERCLA, 42 U.S.C. § 9613), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto. Nothing in this Z2&3 ASAO diminishes the right of the United States, pursuant to Section 113(f)(2) and (3) of CERCLA, 42 U.S.C. § 9613(f)(2)-(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2).

95. The Parties agree that this Z2&3 ASAO constitutes an administrative settlement pursuant to which each Respondent has, as of the Effective Date, resolved liability to the United States within the meaning of Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), and is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, or as may be otherwise provided by law, for the “matters addressed” in this Z2&3 ASAO. The “matters addressed” in this Z2&3 ASAO are the Z2&3 ASAO Work, the Z2&3 ASAO Other Work, and the Z2&3 ASAO Response Costs.

96. The Parties further agree that this Z2&3 ASAO constitutes an administrative settlement pursuant to which each Respondent has, as of the Effective Date, resolved liability to the United States within the meaning of Section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B).

97. Each Respondent shall, with respect to any suit or claim brought by it for matters related to this Z2&3 ASAO, notify EPA in writing no later than 60 days prior to the initiation of such suit or claim. Each Respondent also shall, with respect to any suit or claim brought against it for matters related to this Z2&3 ASAO, notify EPA in writing within 10 days after service of the complaint or claim upon it. In addition, each Respondent shall notify EPA within

10 days after service or receipt of any Motion for Summary Judgment and within 10 days after receipt of any order from a court setting a case for trial, for matters related to this Z2&3 ASAOC.

98. In any subsequent administrative or judicial proceeding initiated by EPA, or by the United States on behalf of EPA, for injunctive relief, recovery of response costs, or other relief relating to the Site, Respondents shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenant by EPA set forth in Section XVIII (Covenants by EPA).

XXIII. INDEMNIFICATION

99. The United States does not assume any liability by entering into this Z2&3 ASAOC or by virtue of any designation of Respondents as EPA's authorized representatives under Section 104(e) of CERCLA, 42 U.S.C. § 9604(e), and 40 C.F.R. 300.400(d)(3). Respondents shall indemnify, save, and hold harmless the United States, its officials, agents, employees, contractors, subcontractors, and representatives for or from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondents, their officers, directors, employees, agents, contractors, or subcontractors, and any persons acting on Respondents' behalf or under their control, in carrying out activities pursuant to this Z2&3 ASAOC. Further, Respondents agree to pay the United States all costs it incurs, including but not limited to attorneys' fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States based on negligent or other wrongful acts or omissions of Respondents, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Z2&3 ASAOC. The United States shall not be held out as a party to any contract entered into by or on behalf of Respondents in carrying out activities pursuant to this Z2&3 ASAOC. Neither Respondents nor any such contractor shall be considered an agent of the United States.

100. The United States shall give Respondents notice of any claim for which the United States plans to seek indemnification pursuant to this Section and shall consult with Respondents prior to settling such claim.

101. Respondents covenant not to sue and agree not to assert any claims or causes of action against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between any one or more of Respondents and any person for performance of Z2&3 ASAOC Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Respondents shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between any one or more of Respondents and any person for performance of Z2&3 ASAOC Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

XXIV. INSURANCE

102. No later than 15 days before commencing any on-site Z2 TST&D Work, Respondents shall secure, and shall maintain until the first anniversary after issuance of Notice of Completion of Z2 TST&D Work pursuant to Section XXVII (Notice of Completion of Z2 TST&D Work), commercial general liability insurance with limits of liability of \$1 million per occurrence, automobile liability insurance with limits of liability of \$1 million per accident, and umbrella liability insurance with limits of liability of \$5 million in excess of the required commercial general liability and automobile liability limits, naming EPA as an additional insured with respect to all liability arising out of the activities performed by or on behalf of Respondents pursuant to this Z2&3 ASAOC. In addition, for the duration of the Z2&3 ASAOC, Respondents shall provide EPA with certificates of such insurance and a copy of each insurance policy. Respondents shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. In addition, for the duration of the Z2&3 ASAOC, Respondents shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Z2 TST&D Work on behalf of Respondents in furtherance of this Z2&3 ASAOC. If Respondents demonstrate by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in a lesser amount, Respondents need provide only that portion of the insurance described above that is not maintained by the contractor or subcontractor. Respondents shall ensure that all submittals to EPA under this Paragraph identify the USS Lead Site in East Chicago, Indiana, and the EPA docket number for this action.

XXV. FINANCIAL ASSURANCE

103. In order to ensure completion of the Z2&3 ASAOC Work and the Z2&3 ASAOC Other Work, Respondents shall secure financial assurance, initially in the amount of \$9 million, for the benefit of EPA. The financial assurance must be one or more of the mechanisms listed below, in a form substantially identical to the relevant sample documents available from EPA or under the "Financial Assurance - Settlements" category on the Cleanup Enforcement Model Language and Sample Documents Database at <https://cfpub.epa.gov/compliance/models/>, and satisfactory to EPA. Respondents may use multiple mechanisms if they are limited to surety bonds guaranteeing payment, letters of credit, trust funds, and/or insurance policies.

a. A surety bond guaranteeing payment and/or performance of the Z2&3 ASAOC Work and the Z2&3 ASAOC Other Work that is issued by a surety company among those listed as acceptable sureties on federal bonds as set forth in Circular 570 of the U.S. Department of the Treasury;

b. An irrevocable letter of credit, payable to or at the direction of EPA, that is issued by an entity that has the authority to issue letters of credit and whose letter-of-credit operations are regulated and examined by a federal or state agency;

c. A trust fund established for the benefit of EPA that is administered by a trustee that has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency;

d. A policy of insurance that provides EPA with acceptable rights as a beneficiary thereof and that is issued by an insurance carrier that is eligible to issue insurance policies in the applicable jurisdiction(s) and whose insurance operations are regulated and examined by a federal or state agency;

e. A demonstration by a Respondent that it meets the financial test criteria of Paragraph 104, accompanied by a standby funding commitment, which obligates the affected Respondent to pay funds to or at the direction of EPA, up to the amount financially assured through the use of this demonstration in the event of an event triggering access to financial assurance under Paragraph 108.a; or

f. A guarantee to fund or perform the Z2&3 ASAO Work and the Z2&3 ASAO Other Work executed in favor of EPA by a company: (1) that is a direct or indirect parent company of a Respondent or has a “substantial business relationship” (as defined in 40 C.F.R. § 264.141(h)) with a Respondent; and (2) can demonstrate to EPA’s satisfaction that it meets the financial test criteria of Paragraph 104.

104. Respondents seeking to provide financial assurance by means of a demonstration or guarantee under Paragraph 103.e or 103.f must, within 30 days of the Effective Date:

a. Demonstrate that:

(1) the affected Respondent or guarantor has:

- i. Two of the following three ratios: a ratio of total liabilities to net worth less than 2.0; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; and a ratio of current assets to current liabilities greater than 1.5; and
- ii. Net working capital and tangible net worth each of at least \$100 million and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; and
- iii. Tangible net worth of at least \$10 million; and
- iv. Assets located in the United States amounting to at least 90 percent of total assets or \$100 million and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; or

(2) The affected Respondent or guarantor has:

- i. A current rating for its senior unsecured debt of AAA, AA, A, or BBB as issued by Standard and Poor’s or Aaa, Aa, A or Baa as issued by Moody’s; and

- ii. Tangible net worth of at least \$100 million and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; and
- iii. Tangible net worth of at least \$10 million; and
- iv. Assets located in the United States amounting to at least 90 percent of total assets or at least \$100 million and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; and

b. Submit to EPA for the affected Respondent or guarantor: (1) a copy of an independent certified public accountant's report of the entity's financial statements for the latest completed fiscal year, which must not express an adverse opinion or disclaimer of opinion; and (2) a letter from its chief financial officer and a report from an independent certified public accountant substantially identical to the sample letter and reports available from EPA or under the "Financial Assurance - Settlements" subject list category on the Cleanup Enforcement Model Language and Sample Documents Database at <https://cfpub.epa.gov/compliance/models/>.

105. Respondents providing financial assurance by means of a demonstration or guarantee under Paragraph 103.e or 103.f must also:

a. Annually resubmit the documents described in Paragraph 104.b within 90 days after the close of the affected Respondent's or guarantor's fiscal year;

b. Notify EPA within 30 days after the affected Respondent or guarantor determines that it no longer satisfies the relevant financial test criteria and requirements set forth in this Section; and

c. Provide to EPA, within 30 days of EPA's request, reports of the financial condition of the affected Respondent or guarantor in addition to those specified in Paragraph 104.b; EPA may make such a request at any time based on a belief that the affected Respondent or guarantor may no longer meet the financial test requirements of this Section.

106. Respondents have selected, and EPA has found satisfactory, the following financial assurances: (i) a surety bond in the form attached as Appendix J with Respondent The Chemours Company FC, LLC as the Principal, EPA Region 5 as the Beneficiary, and \$4.5 million as the amount; and (ii) a surety bond in the form attached as Appendix K with Respondent Atlantic Richfield Company as the Principal, EPA Region 5 as the Beneficiary, and \$4.5 million as the amount. Within 30 days after the Effective Date, Respondents shall secure all executed and/or otherwise finalized mechanisms or other documents consistent with the form of financial assurances attached as Appendices J and K.

107. Respondents shall diligently monitor the adequacy of the financial assurance. If any Respondent becomes aware of any information indicating that the financial assurance provided under this Section is inadequate or otherwise no longer satisfies the requirements of this

Section, such Respondent shall notify EPA of such information within 7 days. If EPA determines that the financial assurance provided under this Section is inadequate or otherwise no longer satisfies the requirements of this Section, EPA will notify the Respondents of such determination. Respondents shall, within 30 days after notifying EPA or receiving notice from EPA under this Paragraph, secure and submit to EPA for approval a proposal for a revised or alternative financial assurance mechanism that satisfies the requirements of this Section. EPA may extend this deadline for such time as is reasonably necessary for the Respondents, in the exercise of due diligence, to secure and submit to EPA a proposal for a revised or alternative financial assurance mechanism, not to exceed 60 days. Respondents shall follow the procedures of Paragraph 109 (Modification of Amount, Form, or Terms of Financial Assurance) in seeking approval of, and submitting documentation for, the revised or alternative financial assurance mechanism. Respondents' inability to secure financial assurance in accordance with this Section does not excuse performance of any other obligation under this Z2&3 ASAOC.

108. Access to Financial Assurance.

a. Triggers for Access to Financial Assurance. Either one of the following shall trigger EPA's right to access to financial assurance:

(1) If EPA issues a notice of implementation of a Z2 TST&D Work Takeover under Paragraph 85.b, then EPA is entitled to: (i) the performance of the Z2 TST&D Work; and/or (ii) require payment of funds from the issuer of the financial assurance mechanism in accordance with Paragraph 108.d; or

(2) If Respondents fail to timely pay any amounts due under Section XIV (Payment of Z2&3 ASAOC Response Costs), then EPA is entitled to require payment of funds from the financial assurance mechanism in accordance with Paragraph 108.d.

b. If EPA is notified by the issuer of a financial assurance mechanism that it intends to cancel the mechanism, and the Respondents fails to provide an alternative financial assurance mechanism in accordance with this Section at least 30 days prior to the cancellation date, the funds guaranteed under such mechanism must be paid prior to cancellation in accordance with Paragraph 108.d.

c. If, upon issuance of a notice of implementation of a Z2 TST&D Work Takeover under Paragraph 85.b or upon a failure by Respondents to pay any amounts due under Section XIV (Payment of Z2&3 ASAOC Response Costs), EPA is unable for any reason to promptly secure the resources guaranteed under any applicable financial assurance mechanism, whether in cash or in kind, to continue and complete the Z2 TST&D Work, the Z2&3 ASAOC Work, and/or the Z2&3 ASAOC Other Work, then EPA is entitled to demand an amount, as determined by EPA, sufficient to cover the cost of the remaining Z2 TST&D Work and/or the cost of the remaining Z2&3 ASAOC Work and/or the cost of the remaining Z2&3 ASAOC Other Work to be performed. Respondents shall, within 14 days of such demand, pay the amount demanded as directed by EPA.

d. Any amounts required to be paid under this Paragraph 108 shall be, as directed by EPA: (i) paid to EPA in order to facilitate the completion of the Z2 TST&D Work, the Z2&3 ASAO Work, or the Z2&3 ASAO Other Work by EPA or by another person; or (ii) deposited into an interest-bearing account, established at a duly chartered bank or trust company that is insured by the FDIC, in order to facilitate the completion of the Z2 TST&D Work, the Z2&3 ASAO Work, or the Z2&3 ASAO Other Work by another person. If payment is made to EPA, EPA may deposit the payment into the EPA Hazardous Substance Superfund or into the USS Lead Z2&3 ASAO Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

e. All EPA Work Takeover costs not paid under this Paragraph 108 must be reimbursed as Z2&3 ASAO Response Costs under Section XIV (Payments for Z2&3 ASAO Response Costs).

109. Modification of Amount, Form, or Terms of Financial Assurance

a. Timing and Requirements for a Request for Modification. Respondents may submit, on any anniversary of the Effective Date or at any other time agreed to by the Parties, a request to reduce the amount and/or to change the form or terms of the financial assurance mechanism. Any such request must be submitted to the Regional Financial Management Officer and EPA as specified in Section XXVIII (Notices). The request must include an estimate of the cost of the remaining Z2&3 ASAO Work, an explanation of the bases for the cost calculation, and a description of the proposed changes, if any, to the form or terms of the financial assurance. EPA will notify Respondents of its decision to approve or disapprove a requested reduction in amount or a requested change in the form or terms pursuant to this Paragraph.

b. Change in Amount. Respondents may reduce the amount of the financial assurance mechanism only in accordance with: (a) EPA's approval; or (b) if there is a dispute, the agreement, final administrative decision, or final judicial decision resolving such dispute under Section XV (Dispute Resolution).

c. Change in Form or Terms. Any decision made by EPA on a request submitted under this Paragraph to change the form or terms of a financial assurance mechanism shall be made in EPA's sole and unreviewable discretion; such decision shall not be subject to challenge by Respondents pursuant to the dispute resolution provisions of this Z2&3 ASAO or in any other forum.

d. Timing for Completing Modification and Submitting Modification. Within 30 days after receipt of EPA's approval of, or the agreement or decision resolving a dispute relating to, the requested modifications pursuant to this Paragraph, Respondents shall submit documents of the reduced, revised or alternative financial assurance mechanism to the Regional Financial Management Officer and to EPA as specified in Section XXVIII (Notices).

110. Release, Cancellation, or Discontinuation of Financial Assurance. Respondents may release, cancel, or discontinue any financial assurance provided under this Section only: (a) if EPA issues a Notice of Completion of Z2&3 ASAOC Work under Section XXVII (Notice of Completion of Z2&3 ASAOC Work); (b) in accordance with EPA's approval of such release, cancellation, or discontinuation; or (c) if there is a dispute regarding the release, cancellation, or discontinuance of any financial assurance, in accordance with the agreement or final decision resolving such dispute under Section XV (Dispute Resolution).

XXVI. MODIFICATION

111. The OSC may modify any plan or schedule of the Z2&3 ASAOC SOW in writing or by oral direction. Any oral modification will be memorialized in writing by EPA promptly, but shall have as its effective date the date of the OSC's oral direction. Any other requirements of this Z2&3 ASAOC may be modified in writing by mutual agreement of the parties.

112. If Respondents seek permission to deviate from any approved work plan or schedule or the Z2&3 ASAOC SOW, Respondents' Project Coordinator shall submit a written request to EPA for approval outlining the proposed modification and its basis. Respondents may not proceed with the requested deviation until receiving oral or written approval from the OSC pursuant to Paragraph 111.

113. No informal advice, guidance, suggestion, or comment by the OSC or other EPA representatives regarding any deliverable submitted by Respondents shall relieve Respondents of their obligation to obtain any formal approval required by this Z2&3 ASAOC, or to comply with all requirements of this Z2&3 ASAOC, unless it is formally modified.

XXVII. NOTICE OF COMPLETION OF Z2&3 ASAOC WORK

114. In order to secure a Notice of Completion of Z2&3 ASAOC Work, Respondents shall schedule a meeting with EPA and shall submit a Z2&3 ASAOC Work Completion Report in accordance with Paragraphs 4.8(b) and 4.8(c), respectively, of the Z2&3 ASAOC SOW. After EPA's review of the Z2&3 ASAOC Work Completion Report, EPA shall follow the provisions of Paragraphs 4.8(d) and 4.8(e) of the Z2&3 ASAOC SOW in responding to Respondents. Consistent with Paragraph 4.8(e) of the Z2&3 ASAOC, when EPA determines that all Z2&3 ASAOC Work, including the activities, if any, under Section IX (Property Requirements), has been fully performed in accordance with this Z2&3 ASAOC, with the exception of any continuing obligations required by this Z2&3 ASAOC, including obligations under Section X (Access to Information), Section XI (Retention of Records) and Paragraph 59 (Periodic Billing or Withdrawal from the Z2&3 ASAOC Special Account for any Z2&3 ASAOC Response Costs Not Previously Billed), EPA will provide written notice to Respondents of the completion of the Z2&3 ASAOC Work.

XXVIII. NOTICES AND SUBMISSIONS

115. All approvals required under this Z2&3 ASAOC or under the Z2&3 ASAOC SOW shall be undertaken in accordance with Paragraph 6.6 of the Z2&3 ASAOC SOW. All deliverables, modifications, notices, objections, proposals, reports, or requests required by the Z2&3 ASAOC SOW shall be undertaken in accordance with the applicable requirements of the

Z2&3 ASAO SOW. All deliverables, modifications, notices, objections, proposals, reports, or requests other than those required by the Z2&3 ASAO SOW shall be undertaken in accordance with this Section.

116. Whenever, under this Z2&3 ASAO, notice is required to be given, or a report or other deliverable is required to be sent, by one Party to another, it must be directed to the person(s) specified below at the address(es) specified below. Any Party may change the person and/or address applicable to it by providing notice of such change to all Parties. All notices under this Section are effective upon receipt, unless otherwise specified. Except as otherwise provided, notice to a Party by email (if that option is provided below) or by regular mail in accordance with this Section satisfies any notice requirement of the Z2&3 ASAO regarding such Party.

As to EPA:

Director, Superfund Division
Region 5, US EPA
77 W. Jackson Blvd. (SR-6J)
Chicago, IL 60604-3590

Jacob Hassan/Daniel Haag/Kristina Behnke
EPA On-Scene Coordinators
Region 5, US EPA
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Behnke.Kristina@epa.gov

Steven Kaiser/Leonardo Chingcuanco
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Chingcuanco.leo@epa.gov

As to the Regional Financial
Management Officer:

Chief
Program Accounting and Analysis Section
Region 5, US EPA
77 W. Jackson Blvd. (MF-10J)

As to the EPA Cincinnati Finance
Center:

EPA Cincinnati Finance Center
26 W. Martin Luther King Dr.
Cincinnati, Ohio 45268
Cinwd_acctsreceivable@epa.gov

As to Respondent Atlantic Richfield Company:

Allison Crane
Remediation Management
Atlantic Richfield Company
201 Helios Way
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Douglas S. Reinhart
Counsel to Atlantic Richfield Company
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Michael H. Elam
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michael.elam@btlaw.com

As to Respondent E. I. du Pont de Nemours and Company:

Patricia McGee
DuPont Legal 721/1268
974 Centre Road
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Phone: 302-996-8275
Patricia.mcgee@dupont.com

DuPont Corporate Remediation Group,
Manager
E.I. du Pont de Nemours and Company
974 Centre Road
Wilmington, DE 19805

As to Respondent The Chemours Company FC, LLC:

Sathya Yalgivi
Project Director
Corporate Remediation Group
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484-678-8984 (Cell)
Sathya.v.Yalvigi@chemours.com

Bernard J. Reilly
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david.rieser@klgates.com

As to Respondent United States
Metals Refining Company:

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K. Scott Statham
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ssatham@fmi.com

David L. Wallis
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Phoenix, Arizona 85016
dlw@gknet.com

XXIX. INTEGRATION/APPENDICES

117. This Z2&3 ASAO and its appendices constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Z2&3 ASAO. The parties acknowledge that there are no representations, agreements, or understandings relating to the settlement other than those expressly contained in this Z2&3 ASAO. The following appendices are attached to and incorporated into this Z2&3 ASAO:

- Appendix A: Z2&3 ASAO SOW
- Appendix B: Map of USS Lead Site OU1 and OU2
- Appendix C: Map of USS Lead Site OU1 – Zones 1, 2, and 3
- Appendix D: Map of Chemours Property
- Appendix E: Preliminary List of Z2 Priority Properties
- Appendix F: Preliminary List of Z2&3 Interior Sampling Residences
- Appendix G: Action Memorandum–Fourth Amendment
- Appendix H: Action Memorandum–Fifth Amendment
- Appendix I: Record of Decision

Appendix J: Form of Financial Assurance: Surety Bond (Chemours)

Appendix K: Form of Financial Assurance: Surety Bond (Atlantic Richfield)


XXX. EFFECTIVE DATE

118. This Z2&3 ASAOC shall be effective on the day it is signed by the Acting Director, Superfund Division, EPA Region 5, or her delegatee.

IT IS SO AGREED AND ORDERED:

U.S. ENVIRONMENTAL PROTECTION AGENCY:

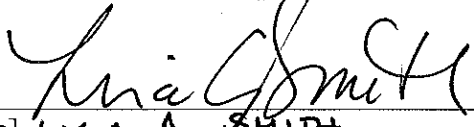
3/16/2017
Dated


for Margaret M. Guerriero
Acting Director, Superfund Division
EPA Region 5
Chicago, IL

Signature Page for Z2&3 ASAOB Regarding USS Lead Superfund Site

FOR ATLANTIC RICHFIELD COMPANY
[Print name of Respondent]

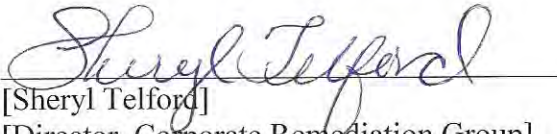
MARCH 15, 2017
Dated


[Name] LISA A. SMITH
[Title] VICE PRESIDENT
[Company] ATLANTIC RICHFIELD COMPANY
[Address] 150 WEST WARRENVILLE RD.
NAPERVILLE, IL 60563

Signature Page for Z2&3 ASAOE Regarding USS Lead Superfund Site

FOR: [The Chemours Company FC, LLC]

March 14, 2017
Dated


[Sheryl Telford]
[Director, Corporate Remediation Group]
[The Chemours Company FC, LLC]
[1007 Market Street, D-3095
Wilmington, DE 19898]

Signature Page for Z2&3 ASAOC Regarding USS Lead Superfund Site

FOR MICHAEL J. LUKAS :
[Print name of Respondent]


3/13/17
Dated

[Signature]
[Name] MICHAEL J. LUKAS
[Title] REMEDIATION TEAM MANAGER
[Company] E. I. du Pont de Nemours and Company
[Address] 974 CENTRE ROAD
Wilmington DE 19805

Signature Page for ZIA3 ASAOE Regarding USS Lead Superfund Site

FOR: United States Metals Refining Company

3/15/17
Dated


L. Richards McMillan II
Senior Vice President
United States Metals Refining Company
333 N Central Avenue
Phoenix, Arizona 85004

ATSDR Reports



Public Health Assessment for

**U.S. SMELTER AND LEAD REFINERY, INC. (USS LEAD)
EAST CHICAGO, INDIANA
EPA FACILITY ID: IND047030226
JANUARY 27, 2011**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE**

Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

Agency for Toxic Substances & Disease Registry Thomas R. Frieden, M.D., M.P.H., Administrator
Howard Frumkin, M.D., Dr.P.H., Director

Division of Health Assessment and Consultation..... William Cibulas, Jr., Ph.D., Director
Sharon Williams-Fleetwood, Ph.D., Deputy Director

Health Promotion and Community Involvement Branch.....Hilda Shepeard, Ph.D., M.B.A., Chief

Exposure Investigations and Consultation Branch..... Susan M. Moore, M.S., Chief

Site and Radiological Assessment Branch Sandra G. Isaacs, B.S., Chief

Cooperative Agreement and Program Evaluation Branch Richard E. Gillig, M.C.P., Chief

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Additional copies of this report are available from:
National Technical Information Service, Springfield, Virginia
(703) 605-6000

You May Contact ATSDR Toll Free at
1-800-CDC-INFO
or
Visit our Home Page at: <http://www.atsdr.cdc.gov>

U.S. Smelter and Lead Refinery, Inc.
(USS Lead)

Final Release

PUBLIC HEALTH ASSESSMENT

U.S. SMELTER AND LEAD REFINERY, INC. (USS LEAD)

EAST CHICAGO, INDIANA

EPA FACILITY ID: IND047030226

Prepared by:
Site and Radiological Assessment Branch
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Agency for Toxic Substances and Disease Registry

I. Foreword

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as the Superfund law. This law set up a fund to identify and clean up hazardous waste sites. The Environmental Protection Agency (EPA) and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment process allows ATSDR scientists and public health assessment cooperative agreement partners flexibility in document format when presenting findings about the public health impact of hazardous waste sites. The flexible format allows health assessors to convey to affected populations important public health messages in a clear and expeditious way.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high-risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to evaluate possible the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals, and community groups. To ensure that the report responds to the community's health concerns, an

early version is also distributed to the public for their comments. All the public comments that related to the document are addressed in the final version of the report.

Conclusions: The report presents conclusions about the public health threat posed by a site. Ways to stop or reduce exposure will then be recommended in the public health action plan. ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA or other responsible parties. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also recommend health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

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ATSDR Records Center (MS F-09)
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Building 106, Room 2108
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II. Summary

SUMMARY

INTRODUCTION ATSDR's top priority is to ensure that people living in East Chicago have the best information possible to safeguard their health.

ATSDR revisited this health assessment in response to EPA reproposing the site to the Superfund. The U.S. Smelter and Lead Refinery, Inc. (USS Lead), in East Chicago, Indiana, had operated as a primary and secondary smelting facility from 1906 until 1985. Since 1920, the primary product of USS Lead had been lead. Wastes which were produced during smelting operations are calcium sulfate sludge, blast furnace flue-dust, bag-house bags, rubber and plastic battery casings, and waste slag. Much of these wastes were stored on-site for recycling or disposal. All of the wastes, as well as on-site surface soils, are heavily contaminated with lead and other metals. The plant ceased operations in 1985. Clean-up efforts were overseen by the Indiana Department of Environmental Management. The site was proposed to the National Priorities List in February 1992, when USS Lead's parent company, Sharon Steel, filed for bankruptcy, but was never actually listed. EPA again proposed listing the site on the NPL in September 2008 and it was listed "Final" on April 9, 2009¹.

The limited sampling information that is available indicates that prior to the on-site removal action in the mid-1990s, on-site soils and wastes were contaminated with lead and other metals. The on-site buildings were demolished and along with the on-site waste, were buried on-site and capped. There is no data available to confirm that the on-site waste was contained and is not still accessible. There is also no current data on contamination levels in the wetlands or river bank that are down gradient from the former facility.

Additional sampling of surface soil from residential yards found substantial lead contamination had spread off-site as far as one-half mile to the north and northeast of the site. Ambient air monitoring, available for 1985 through 1989, indicated that elevated levels of lead were present in ambient air, both on- and off-site in 1985 when the smelter was in operation, but not since. Homes and yards to the North and Northeast of the site are safe and do not pose a health hazard from lead.

CONCLUSIONS	ATSDR reached 4 important conclusions in the health assessment:
Conclusion 1	U.S. Smelter and Lead Refinery site posed a hazard to public health in the past from breathing in lead contaminated air prior to 1985.
Basis for conclusion	When the smelter was in full operation, prior to 1985, the active smelter released significant quantities of lead contamination that was deposited on neighboring yards to the North and Northeast of the site.
Conclusion 2	Prior to 2006, lead contamination in yards downwind of the USS Lead site posed a public health hazard in the past for young children eating contaminated soil.
Basis for conclusion	EPA found substantial lead in surface soil in neighboring yards to the North and Northeast of the site, prior to removing the remaining contaminated soil in 2006.
Conclusion 3	Breathing the air, drinking tap water or playing in soil in neighborhoods near the USS Lead Site is not expected to harm people's health.
Basis for conclusion	The declining blood lead levels in small children appear to confirm that they are no longer exposed to lead from any source.
Conclusion 4	There is a lack of environmental data from the USS Lead Site, specifically in the area near the Grand Calumet River and around the landfill.
Basis for conclusion	The EPA Hazard Ranking relied on data taken prior to closure of the facility.
Next Steps	EPA needs to perform a comprehensive Remedial Investigation and Feasibility Study (RI/FS) for the US Smelter and Lead Refinery.
FOR MORE INFORMATION	For further information about this public health assessment, please call ATSDR at 1-800-CDC-INFO and ask for information about the "US Smelter and Lead Refinery" site. If you have concerns about your health, you should contact your health care provider.

III. Background

III.A. Site Description and History

The U.S. Smelter and Lead Refinery, Inc. (USS Lead) formerly operated on a 79-acre tract of property at 5300 Kennedy Avenue in East Chicago, Lake County, Indiana. The Indiana Harbor Belt Railroad is to the north of the site, the east-west toll road, and the east branch of the Grand Calumet River to the south, Kennedy Avenue to the east and Indiana Harbor Canal to the west. It lies within the flood plain of the Grand Calumet River.

From about 1906 to 1920 a copper smelter operated on the property. An additional facility to produce arsenic may have also existed on-site. All of the buildings were demolished and removed in the mid-1990s including; the Tank House (bag-house dust), Store Building, Club Building, Main Office and Laboratory Building, Sulfuric Acid Building (renamed the Battery Breaker Building), Tellurium Building, and the Byproducts Building. There was also an Old Silver Refinery Building, which was demolished in the late 1960s. Starting in 1920, among other activities, USS Lead operated a primary lead smelter on 25 acres of the property. In 1973, USS Lead converted to secondary smelting, recovering lead from scrap metal and old automobile batteries. Batteries were dismantled on-site, littering the area with rubber and plastic battery casings, and contaminating area soils with battery acids. Two waste materials were generated during smelting. The blast furnace slag was piled up south of the plant building. The pile was leveled off once a year into what was originally a nearby 21-acre wetland, according to the Army Corps of Engineers. Tests conducted in 1986 by the Indiana Department of Environmental Management (IDEM) detected elevated levels of lead in the slag. The second waste material, lead-containing flue-dust emitted by the blast furnace stack was originally trapped in bag filters and stockpiled on-site for possible recycling or sale. A larger blast furnace installed in 1973 was intended to recycle both new and stockpiled dust. The stockpiled dust covered a three to five-acre area. In 1982, the dust was brought under cover in the Tank House building to prevent dispersion by wind and rain. The dust was removed from the site in June 1992.

In 1975, USS lead received a permit under the National Pollutant Discharge Elimination system (NPDES) to discharge furnace cooling water and storm water runoff collected from the site to the Grand Calumet River. A second permit was issued in April 1985. Over the years, the permit levels for lead, cadmium, copper, arsenic, and zinc were frequently exceeded according to IDEM. In the 1980s, several state and federal enforcement actions were taken against USS Lead for permit violations. These violations, plus the dumping of slag water into the wetland contributed to past contamination of surface water in the area.

USS Lead ceased operation in December 1985. The site was proposed by the US Environmental Protection Agency (US EPA) to the National Priorities List (NPL) in February 1992, after USS Lead's parent company, Sharon Steel Corp, filed for bankruptcy. USS Lead's new parent company, Mueller Industries, Inc. had agreed to financially support the clean-up activities at the site. The RCRA Administrative Order with USS Lead was entered into in 1993. Since 1999 all structures on the site have been demolished and removed. Contaminated materials have since

been buried on-site and are no longer accessible. The Corrective Action Management Unit (CAMU) was built in 1999. The CAMU is a capped landfill constructed on-site. The demolished buildings and lead-contaminated soil were buried in the CAMU. Nothing was transported off-site for disposal. No post remediation sampling data is available to confirm that the contamination is contained or no longer accessible.

RCRA referred the residential areas to Superfund in 2004, which only relates to residential properties immediately to the north and northeast and within half a mile from the site. 14 residential properties were identified and had their yards remediated, but several hundred other residential yards may still be contaminated. RCRA referred the USS Lead Site (the facility property footprint) to Superfund in 2006. Contaminated wetlands and contaminated soil remain on-site.

In ATSDR's Public Health Assessment for the U.S. Smelter and Lead Refinery², Inc. dated August 4, 1994, the agency concluded that contamination from the site was a public health hazard. The agency also concluded there was insufficient sampling data to fully characterize the extent of the contamination, and recommended the need for further characterization of residential soil to determine the risk to human health. In February 1997, the Indiana State Department of Health (ISDH) requested that ATSDR perform an Exposure Investigation (EI), which is discussed in full on page 7. The EI was designed to address the data gaps identified in the 1994 public health assessment. More details on ATSDR's 1998 EI are provided in the Health Outcome Data section on page 8. In September 2008, the US EPA again proposed to list the USS Lead site on the NPL, due to lapse of RCRA authority. On April 9, 2009 the site was listed as "Final" on the Superfund¹.

III.B. Demographics, Land Use, and Natural Resource Use

III.B.1. Demographics

The U.S. Census Bureau estimated that the population of East Chicago had declined to 30,594 by 2006, which was down 5.6% from 32,414 reported in the 2000 Census. In 1980, when the USS Lead facility was still in operation, the population of East Chicago was 39,786. ATSDR estimates that there are currently 11,818 persons living within one mile of the former facility. The closest household is within one-quarter mile from the site.

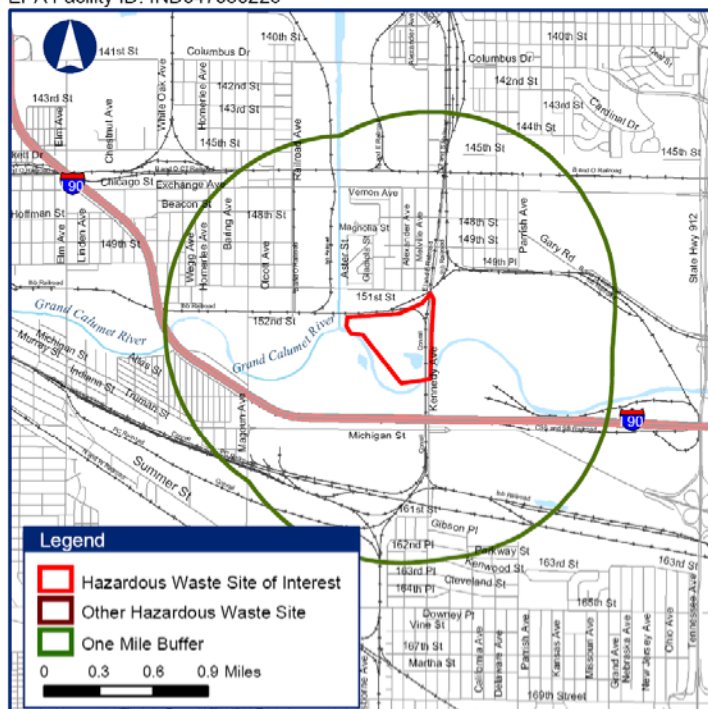


Figure 1 Aerial View of Former USS Lead Site*
*(dated March 2005 from Google Earth)

U.S. Smelter and Lead Refinery, Inc. East Chicago, IN



EPA Facility ID: IND047030226



Site Location: Lake County, IN

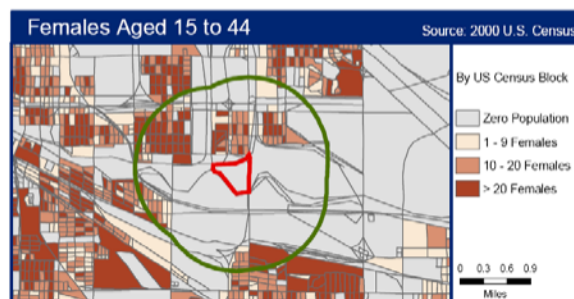
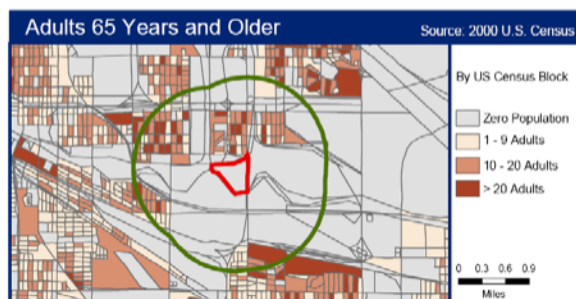
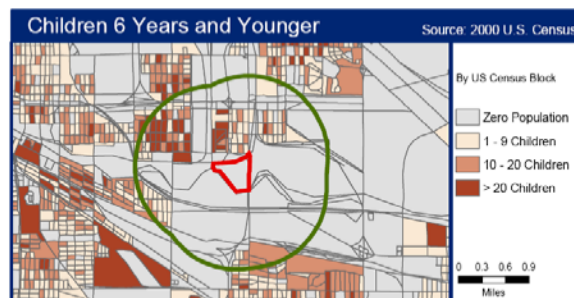
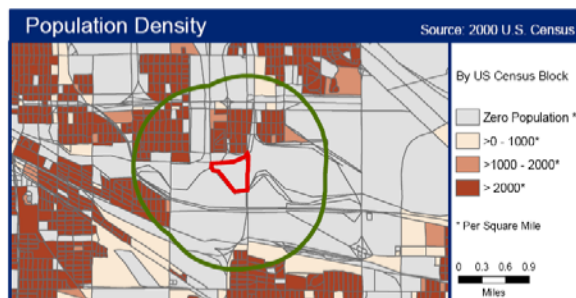


Demographic Statistics Within One Mile of Site*

Total Population	11,818
White Alone	5,102
Black Alone	3,950
Am. Indian & Alaska Native Alone	63
Asian Alone	12
Native Hawaiian & Other Pacific Islander Alone	15
Some Other Race Alone	2,331
Two or More Races	345
Hispanic or Latino**	5,423
Children Aged 6 and Younger	1,513
Adults Aged 65 and Older	1,632
Females Aged 15 to 44	2,610
Total Housing Units	4,862

Base Map Source: Geographic Data Technology, May 2005.
Site Boundary Data Source: ATSDR Geospatial Research, Analysis, and Services Program,
Current as of Generate Date (bottom left-hand corner).
Coordinate System (All Panels): NAD 1983 StatePlane Indiana West FIPS 1302 Feet

Demographics Statistics Source: 2000 U.S. Census
* Calculated using an area-proportion spatial analysis technique
** People who identify their origin as Hispanic or Latino may be of any race.



<project=03401><userid=JXAD><geo=Lake County,IN><keywords=IND047030226, US Smelter>

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Figure 2 Demographics within One Mile of USS Lead Site

III.B.2. Land Use

Land use in the immediate area is predominantly industrial; a DuPont Plant is located to the west, across Kennedy Avenue, and a tank farm is to the south, across the Grand Calumet River. Much of the southern part of the site adjacent to the Grand Calumet River is swamp. The nearest residences are within one-quarter mile north of the site. The site boundary is fully fenced to keep out trespassers.

III.B.3. Natural Resource Use

All water for drinking, commercial, and industrial uses is obtained from Lake Michigan. No private wells are in use near the site. A total of 4.1 million people obtain drinking water from intakes primarily into Lake Michigan within 15 miles downstream of where hazardous waste substances from the site enter into surface water. Lake Michigan, 3 miles south of the site, is used for fishing. The Grand Calumet River and Indiana Harbor, into which the river drains, are not fished. Hammond Beach Marina, which is used for recreation, is 4 miles west from where the canal enters Lake Michigan. Wabala Beach and several other major recreation areas are within 15 miles of the site.

III.B.4. Health Outcome Data

In May 1998, ATSDR completed an Exposure Investigation³ which tested the blood-lead concentration of children in the West Calumet and Calumet communities to the North of the USS Lead site. Out of 98 participants, ten children had slightly elevated blood-lead concentrations between 10-20 µg/dL and 30% of children 6 years of age and under had blood lead levels greater than 10 µg/dL. Prior to 1992 more than 40% of the tested children under 6 years old in the West Calumet and Calumet communities exceeded blood-lead concentrations of 10 µg/dL. The Indiana State Department of Health (ISDH) has continued to collect blood lead data for this critical age group. The results can be seen in Table 1 and is also displayed in graphical form. A graph of historic blood lead levels for children under 6 years of age in the surrounding community can be seen in Figure 3.

Excess blood lead levels (EBBL) in the critical age group of children ages 0 to 6 years old appear to have fallen and are now consistent with the national average. The excellent work of the ISDH (nearly 100% testing of children in East Chicago and the abatement of lead paint in homes) and the removal of lead in gasoline are probably the reasons for the significant reduction in blood lead levels since the mid-90s.

**Table 1 Historic Exceedances of Blood Lead Level (EBLL)
for Children 6 and Younger in E. Chicago***

<i>Year</i>	<i>Children Tested</i>	<i>EBLL</i>	<i>% EBLL</i>
1998	164	12	7.3%
1999	133	6	4.5%
2000	110	14	13%
2001	121	9	7.4%
2002	479	21	4.4%
2003	670	31	4.6%
2004	939	40	4.3%
2005	977	54	5.5%
2006	960	31	3.2%
2007	905	29	2.3%
2008	1019	28	2.7%

*Data provided by ISDH

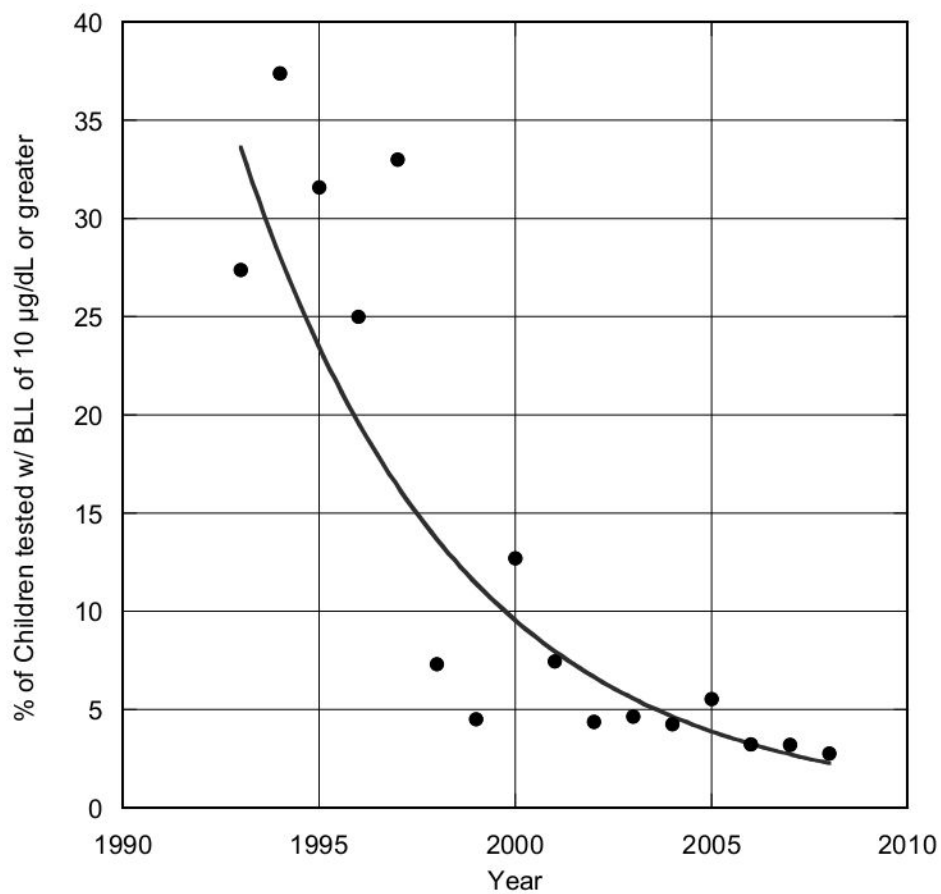


Figure 3 East Chicago Historic Lead Screening Data

IV. COMMUNITY HEALTH CONCERNS

No community health concerns were identified through questioning of representatives of the Lake County Health Department, the US EPA, and the Indiana Department of Environmental Management.

The ISDH in coordination with ATSDR released a public health assessment for public comment on May 20, 1993. The public comment period lasted until June 21, 1993. No comments were received by the ISDH in this period.

V. ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The U.S. Environmental Protection Agency (EPA) has conducted site remediation and community removal actions under the authority of the Resource Conservation and Recovery Act (RCRA). There has never been a Remedial Investigation or Feasibility Study (RI/FS) in the nearly 20 years since the site was originally proposed to the NPL. The only environmental sampling data is from neighborhood yards prior to a removal action and their remediation with clean fill.

The community to the north of the site has had several sampling events and a removal action in 2006. In May 2006, the On Scene Coordinator (OSC) from EPA oversaw a removal action of contaminated yard soil and backfill with clean soil at 14 properties in the downwind neighborhood. Prior to remediation, surface soil (0–1 inch) average lead concentrations ranged from 2,800 to 120 mg/kg prior to remediation. The arithmetic mean (i.e., average) concentration from those yards was 870 mg/kg in dry soil. The vast majority (>80%) of those 14 yards had concentrations that threatened the health of young children, 6 years of age and younger. The US EPA reported that the yards with the worst lead contamination have all been remediated and that the remaining yards have soil concentrations of lead below 120 mg/kg.

There are apparently no data available for lead concentrations on the former site of the U.S. Smelter and Lead Refinery, Inc. since it was partially remediated. The Hazard Ranking System (HRS) document⁴ for USS Lead discusses pre-remediation soil, water and air samples that are no longer relevant. There does not appear to have been any coordinated post-remediation confirmatory sampling of the landfill, or any sampling of the wetlands down-gradient from the former site's facilities. EPA has not yet begun a remedial investigation of the site.

Table 2 Lead Concentration in Neighborhood Yards (0-1 inch depth)

Prior to Removal Action

<i>Property ID</i>	<i>Location</i>	<i>Lead Concentration (mg/kg)</i>
X03	Backyard	2300
X13	Frontyard	1500
X42	Backyard	1400
X10	Backyard	1300
X07	Backyard	1200
X07	Frontyard	1200
X49	Backyard	1100
X19	Frontyard	1000
X24	Backyard	1000
X49	Frontyard	980
X13	Backyard	940
X50	Backyard	910
X46	Backyard	900
X26	Frontyard	880
X10	Frontyard	840
X50	Frontyard	830
X19	Backyard	810
X42	Frontyard	740
X15	Backyard	700
X46	Frontyard	690
X03	Frontyard	680
X26	Backyard	630
X24	Frontyard	620
X15	Frontyard	460
X48	Backyard	290
X48	Frontyard	150
X35	Backyard	120
X35	Frontyard	92

⁵Data from EPA Reg. V. May 2006 Removal Action

Table 3 Lead Concentration in Neighborhood Yards (1-6 inch depth)
Prior to Removal Action

<i>Property ID</i>	<i>Location</i>	<i>Lead Concentration (mg/kg)</i>
X49	Backyard	2800
X07	Backyard	1800
X50	Backyard	1500
X03	Backyard	1400
X26	Backyard	1400
X46	Backyard	1300
X10	Backyard	1100
X19	Frontyard	1100
X19	Backyard	1000
X49	Frontyard	1000
X07	Frontyard	980
X10	Frontyard	870
X03	Frontyard	780
X15	Backyard	780
X42	Backyard	760
X10	Frontyard	750
X13	Backyard	690
X26	Frontyard	690
X46	Frontyard	680
X46	Frontyard	670
X26	Frontyard	630
X24	Frontyard	560
X42	Frontyard	560
X13	Frontyard	530
X50	Frontyard	520
X15	Frontyard	510
X24	Backyard	430
X48	Backyard	360
X48	Frontyard	290
X35	Frontyard	130
X35	Backyard	120

Data from EPA Reg. V. May 2006 Removal Action

VI. Discussion

The facility has been shut down since December of 1985. Sampling data taken during a limited past removal action indicate that residential yards within half a mile to the north and northeast of the site appeared to have significant levels of lead in the top several inches of soil, prior to remediation. The site buildings and above ground contamination have been buried and capped on-site, leaving a large paved area where the facility once stood. The site has been fenced and intrusion is kept to a minimum.

VI.A. Toxicological Implications

Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil.

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. EPA began working to reduce lead emissions soon after its inception, issuing the first reduction standards in 1973, which called for a gradual reduction of lead to one tenth of a gram per gallon by 1986. The average lead content in gasoline in 1973 was 2-3 grams per gallon or about 200,000 tons of lead a year. In 1975, passenger cars and light trucks were manufactured with a more elaborate emission control system which included a catalytic converter that required lead-free fuel. In 1995 leaded fuel accounted for only 0.6 percent of total gasoline sales and less than 2,000 tons of lead per year. Effective January 1, 1996, the Clean Air Act banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles⁶.

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia.

VI.B. Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health. ATSDR is committed to evaluating children's sensitivities at areas such as the USS Lead Site.

ATSDR has attempted to identify populations of children in the vicinity of the USS Lead Site and any public health hazards threatening these children. Some 1500 children aged 6 and younger live within a 1-mile radius of the USS Lead Site. All calculations, health guidelines, and comparison values consider the sensitivities of children.

14 remaining down wind yards were sampled prior to a removal action. The average surface soil concentration in those yards was 870 mg/kg prior to remediation. These concentrations were probably representative of the soil concentrations in the downwind neighborhoods, prior to remediation. ATSDR concludes that children who contact lead-contaminated soil in the past, while playing in lead-contaminated soil on unremediated yards within half a mile to the north and northeast of the USS Lead Site were at risk of health problems in the past.

Children can also be exposed to lead from paint by eating sweet-tasting lead paint chips or, through hand-to-mouth behavior, by eating lead paint dust. ATSDR recommends that parents concerned about their children's exposure to lead have their children's blood lead levels tested by their health care provider.

Different investigators have found widely varying relationships between soil and dust lead levels and children's blood lead levels. Based on a review of other investigators, the Centers for Disease Control and Prevention (CDC) reports that blood lead levels generally rise 3 to 7 micrograms per deciliter ($\mu\text{g}/\text{dL}$) for each increase of 1,000 ppm of lead in soil or dust^{7,8,9,10}. The CDC has established a blood lead level of 10 $\mu\text{g}/\text{dL}$ (10 micrograms of lead per deciliter of blood) as a level of concern for case management. It should be noted, though, that lead levels below 10 $\mu\text{g}/\text{dL}$ also cause harmful effects in children.

CDC established their case management level of 10 $\mu\text{g}/\text{dL}$ after evaluating a large number of rigorous epidemiologic and experimental studies. In particular, recent human studies have

provided new evidence about the association between low-level lead exposure and harmful development effects in children¹¹. Low level lead exposure is associated with decreased intelligence and impaired neurobehavioral development. Many other effects begin at low blood lead levels, including decreased stature or growth, decreased hearing, and decreased ability to maintain a steady posture, and become more pronounced at higher blood lead levels.

In the past, elevated levels of lead in soil of properties downwind from the USS Lead site along with lead from other sources increases the risk in some preschool children for having increased levels of lead in their blood. Low-level exposure to lead is expected to cause the following health effects in some children:

- neurobehavioral effects, such as decreased intelligence or delays in development,
- impaired growth (decreased stature),
- endocrine effects, most commonly altered vitamin D metabolism,
- blood effects, such as changes in blood enzyme levels, and
- decreased performance on hearing tests.

These lead-related effects are documented in several population studies that investigated the harmful effects of lead¹.

In evaluating public health issues concerning children and lead, it is important to remember that children get exposed to lead from many sources. In addition to lead coming from soil, children also get exposed to lead from other sources. Here are a few examples:

- lead in a child's diet,
- lead in drinking water,
- lead from leaded paint,
- lead from lead-glazed pottery,
- other unidentified sources.

VII. Conclusions

1. ATSDR concludes that the U.S. Smelter and Lead Refinery site posed a hazard to public health in the past from breathing in lead contaminated air prior to 1985.
2. ATSDR concludes that prior to 2006, lead contamination in yards downwind of the USS Lead site posed a public health hazard in the past for young children eating contaminated soil.
3. ATSDR concludes that breathing the air, drinking tap water or playing in soil around the USS Lead Site is not expected to harm people's health, as indicated by the declining blood lead levels in small children.
4. ATSDR concludes that there is a lack of current environmental data from the USS Lead Site, specifically in the area near the Grand Calumet River.

VIII. Recommendations

1. ATSDR recommends that EPA perform confirmatory sampling to ensure the on-site landfill is preventing access to contamination and that it is not leaking.
2. ATSDR recommends that EPA systematically sample for lead and heavy metals on-site in the wetlands and river bank.

IX. Public Health Action Plan

1. ATSDR completed a final public health assessment for the U.S. Smelter and Lead Refinery site in 1994, which concluded that lead contamination was a public health hazard from contaminated soil both on-site and in the neighborhood to the north and northeast within half a mile.
2. As a follow-up to data gaps identified in the 1994 public health assessment, NCEH in coordination with the Indiana State Department of Health performed blood lead testing of local residents.
3. The Indiana State Department of Health has continued blood lead testing of children in East Chicago annually since 1991.

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Health Consultation

Historical Blood Lead Levels in East Chicago, Indiana Neighborhoods
Impacted by Lead Smelters

U.S. SMELTER AND LEAD REFINERY, INC.

EAST CHICAGO, INDIANA

EPA FACILITY ID: IND047030226

AUGUST 16, 2018

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

Historical Blood Lead Levels in East Chicago, Indiana Neighborhoods
Impacted by Lead Smelters

U.S. SMELTER AND LEAD REFINERY, INC.

EAST CHICAGO, INDIANA

EPA FACILITY ID: IND047030226

Prepared By:

U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
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Summary

The U.S. Environmental Protection Agency (EPA) is investigating and remediating residential properties contaminated by emissions from former industrial facilities within the boundaries of the USS Lead Superfund site ("Site") in East Chicago, Indiana. The former industrial facilities included lead smelters, lead refineries, and a processing facility that manufactured white lead used in the formulation of lead-based paint.

CDC's National Center for Environmental Health (NCEH), Agency for Toxic Substances and Disease Registry (ATSDR), and Indiana State Department of Health (ISDH) examined the trends and locations of blood lead levels in the residential areas within the Site. We reviewed 11 years (2005-2015) of blood lead test results for young children living in the residential areas within the Site, designated as: Zone 1 (West Calumet Housing Complex, a federally-funded public housing facility); Zone 2 (Calumet neighborhood); and Zone 3 (East Calumet neighborhood), which are located within the City of East Chicago and compared them to the rest of East Chicago (also referred to as "Other East Chicago" within this report. Based on this assessment, the public health agencies have drawn the following conclusions.

Conclusions

Conclusion 1: The percentage of young children (less than 6 years of age) living in the residential areas of the USS Lead site and across the rest of East Chicago with blood lead levels greater than or equal to (\geq) 5 $\mu\text{g}/\text{dL}$ ¹ continued to decline between 2005 and 2015.

Basis for Conclusion: From 2005 to 2015, the percentage of blood lead tests results that are greater than the current CDC reference level of 5 $\mu\text{g}/\text{dL}$ have been gradually declining within each of Calumet neighborhoods, across all of East Chicago, and across all of Indiana.

Conclusion 2: The number of blood lead tests for children younger than 6 years of age tested for blood lead across the City of East Chicago declined from 2008 to 2015. This decline has occurred in an area where children are at risk for higher blood lead levels from high soil lead levels and other possible sources of lead exposure. This decline is similar to the overall decline in blood lead testing among children in Indiana as a whole.

Basis for Conclusion: The average number of blood lead tests for young children (less than 6 years of age) in all of **East Chicago** during the 11-year period (2005 to 2015) declined from 2008 through 2014 (Figure 1). A similar decline in the number of tests was also found within the residential areas of the USS Lead site (i.e. West Calumet Housing Complex, Calumet neighborhood, and East Calumet neighborhood). The number of children <6 years old living in East Chicago dropped 3% between 2000 and 2010, according to the US Census data. However, this slight decrease in population does not account for the decline in children tested. After 2011, the number of blood lead tests conducted also declined across the entire state of Indiana (ISDH, 2015).

¹ In 2012, the Centers for Disease Control and Prevention (CDC) updated its recommendations on children's blood lead levels. Prior to that, CDC used 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) as the "level of concern" to identify children who require case management. A reference level of 5 $\mu\text{g}/\text{dL}$ is currently used to evaluate children who have been exposed to lead, based on the 97.5th percentile of the distribution of national blood lead levels in children (National Health and Nutrition Examination Survey (NHANES)).

Conclusion 3: Young children (less than 6 years of age) living in the **West Calumet Housing Complex (WCHC) (Zone 1)** had a higher percentage of blood lead levels greater than or equal to (\geq) 5 $\mu\text{g}/\text{dL}$ between 2005 and 2015, compared with other areas of East Chicago (not including Zones 1,2 and 3).

Basis for Conclusion: Over the period of 2005-2015, a child living in WCHC (Zone 1) had nearly a three times greater chance of having a blood lead level \geq 5 $\mu\text{g}/\text{dL}$ (Odds Ratio = 2.93), compared to a child living in Other East Chicago (not in Zones 1, 2, or 3). During that time, 27.5% of the blood lead test results were \geq 5 $\mu\text{g}/\text{dL}$, compared to 11.5% for the remainder of East Chicago. Also during that time 4.4% of the blood lead results were \geq 10 $\mu\text{g}/\text{dL}$, compared to 1.6% for the remainder of East Chicago.

Conclusion 4: Young children living in the **Calumet neighborhood (Zone 2)** have also experienced a similar higher percentage of blood lead levels \geq 5 $\mu\text{g}/\text{dL}$ as children living in WCHC, compared to the other areas of East Chicago (not including Zones 1,2 and 3).

Basis for Conclusion: Over the period of 2005-2015, a child living in the Calumet neighborhood (Zone 2) also had almost a three times greater chance of having a blood lead level \geq 5 $\mu\text{g}/\text{dL}$ (Odds Ratio = 2.86), compared a child living in Other East Chicago (not including Zones 1,2, and 3). During that time, 28.2% of the blood lead tests were \geq 5 $\mu\text{g}/\text{dL}$, compared to 11.5% for the remainder of East Chicago. Also during that time, 5.7% of the blood lead tests were \geq 10 $\mu\text{g}/\text{dL}$, compared to 1.6% for the remainder of East Chicago.

Conclusion 5: Young children living in the **East Calumet neighborhood (Zone 3)** had a similar percentage of blood lead levels \geq 5 $\mu\text{g}/\text{dL}$, but a higher percentage of blood lead levels \geq 10 $\mu\text{g}/\text{dL}$, compared to other areas of East Chicago (not including Zones 1, 2, and 3).

Basis for Conclusion: Over the period of 2005-2015, a child living in the East Calumet neighborhood (Zone 3) had a similar chance of having a blood lead level \geq 5 $\mu\text{g}/\text{dL}$ (odds ratio = 0.94), compared to a child living in Other East Chicago. During that time, 11.3% of the blood lead tests were \geq 5 $\mu\text{g}/\text{dL}$, compared to 11.5% for the remainder of East Chicago. Also during that time, 3.0% of the blood lead tests were \geq 10 $\mu\text{g}/\text{dL}$, compared to 1.6% for the remainder of East Chicago.

Background and Statement of Issues

The U.S. Smelter and Lead Refinery, Inc. (USS Lead) operated on a 79-acre property at 5300 Kennedy Avenue in East Chicago, Indiana as a primary and secondary lead smelting facility beginning in 1906. From 1920 until 1973, USS Lead operated as a primary lead smelter, which involved processing and smelting of the mined ore, followed by refining the lead through an electrolytic process to generate high purity lead casting (EPA, 2012). In 1973, the facility converted to secondary smelting, which includes recovering lead from scrap metal and automobile batteries. Wastes from the smelting operations and on-site surface soils were heavily contaminated with lead and other metals (EPA, 2012). After USS Lead operations ceased in 1985, the Indiana Department of Environmental Management (IDEM) oversaw clean-up efforts by the responsible party.

The U.S. Environmental Protection Agency (EPA) initially proposed the USS Lead site to the National Priorities List (NPL) in 1992 when USS Lead's parent company, Sharon Steel, filed for bankruptcy. However, EPA did not list USS Lead as a Superfund NPL site until 2008. The USS Lead site, as defined under the NPL listing, includes the former industrial facility and the West Calumet, Calumet, and East Calumet residential neighborhoods just to the north of the former facility. Also included within the USS Lead site was another lead smelting and refining facility operated by the former Anaconda Lead Products and International Lead Refining Company (ILRC). ILRC

processed lead bullion from its smelter in Tooele, Utah and from the ARASCO smelter in Montana from 1911 until 1968. Anaconda Lead Products operated a process that manufactured white lead for use in paint products.

After operations ceased at the ILRC facility in 1968, the City of East Chicago acquired the property and received federal housing funds from U.S. Department of Housing and Urban Development (HUD) to construct a public housing complex on the footprint of the former industrial property. The West Calumet Housing Complex (WCHC) was opened in 1972, and until recently, the complex housed more than 1,000 residents in the 350 units. Appendix A shows a map of the former ILRC/Anaconda in relation to WCHC and the Carrie Gosch Elementary School. Appendix B shows the timeline of a redevelopment of the residential areas within the USS Lead Superfund site. Appendix C shows the boundaries of the specific areas of investigation (Zones 1, 2, and 3) within the residential portion of the USS Lead site.

ATSDR released a *Preliminary Public Health Assessment* (PHA) for the USS Lead site in 1994. We concluded that “the site was a public health hazard because chronic exposure to contaminated soils, wastes, and airborne dusts could cause adverse health effects”. ATSDR recommended soil testing in the residential properties and identified that there was insufficient information available about blood lead levels in children living in areas contaminated by the USS Lead site. In 1997, ISDH and ATSDR collaborated to conduct an exposure investigation of residents within the West Calumet and Calumet neighborhoods. This document includes a summary of the results of that investigation (ATSDR 1998).

1990-1997 Blood Lead Data

The Indiana Childhood Lead Prevention Program provided the CDC Lead Poisoning Prevention Program with blood lead level (BLL) data for children living in the Calumet neighborhoods (West Calumet, Calumet, and East Calumet). The data included blood lead test results for both capillary and venous blood samples of children under 6 years of age. A review of that data showed that between 1990 to 1997, 30.9% of the children had blood lead levels ≥ 10 $\mu\text{g}/\text{dL}$ (the CDC blood lead “level of concern” at that time) as compared to the 1993 statewide prevalence rate of 10.9% for children’s BLLs ≥ 10 $\mu\text{g}/\text{dL}$. The average BLL for this neighborhood during that time was 8.31 $\mu\text{g}/\text{dL}$ (ATSDR, 1998).

1998 ISDH/ATSDR Exposure Investigation

In the 1994 PHA, ATSDR recommended evaluating blood lead levels in children who lived in the West Calumet Housing Complex (ATSDR, 1994). This population was of specific concern because the housing units were constructed on the property of a former lead smelter and processing facility, operated by the former Anaconda Lead Products and ILRC. In 1996, ISDH requested ATSDR assist them in conducting an Exposure Investigation (EI) to address community health concerns and to evaluate potential exposures to lead. The EI focused on two community neighborhoods, West Calumet and Calumet. The results showed that 30.0% of the children <6 years old tested in the West Calumet and Calumet neighborhoods had blood lead levels that were ≥ 10 $\mu\text{g}/\text{dL}$, compared to 10.9% statewide at that time (ATSDR, 1998). Based on these findings, ATSDR recommended: 1) conducting follow-up investigations of participants with an elevated blood lead level, including determining the source of exposure, determining the need for additional soil sampling, and conducting follow-up testing on all of the children; 2) providing healthcare provider education (completed in Oct. 1997); and 3) remediating lead-contaminated soil at the Anaconda site. While it was ATSDR’s understanding that IDEM had scheduled the remediation, no remediation actually occurred until years later.

In 2011, ATSDR issued a Public Health Assessment document that included a statement that declining blood lead levels in small children was an indication that breathing the air, drinking tap water, or playing in soil around the USS Lead Site is not expected to harm people’s health. However, it should be noted that the statement was based on a review of blood lead data provided to ATSDR for all young children in East Chicago and did not focus specifically on the levels in children living in the residential areas within the USS Lead site.

More recent EPA soil test results from 2014 and 2015 for the West Chicago Housing Complex and in the Calumet and East Calumet neighborhood led to renewed concerns about lead exposure to children living in these areas. This concern led to an intensive campaign beginning in July 2016 by ISDH and the East Chicago Health Department, with support from ATSDR, to conduct blood lead testing of children living in these areas, at schools, community centers, and in their homes.

Review of Blood Lead Data - Calumet Neighborhood Children

The purpose of this review of blood lead levels from 2005 to 2015 in East Chicago neighborhoods was to:

- Evaluate trends in blood lead testing of children living in neighborhoods impacted by lead smelting facilities to ensure that exposed individuals are being identified
- Evaluate any differences in blood lead levels (BLLs) within these neighborhoods, compared to the rest of East Chicago or the state of Indiana, which informs an assessment of exposure to lead sources in these areas. A more detailed analysis of the correlation of blood lead data with environmental data will be provided in the upcoming PHA report.
- Provide a basis for responding to community health concerns

2005-2015 Blood Lead Data

CDC's NCEH analyzed ISDH blood lead test results from 2005 to 2015 for children younger than 6 years of age who lived in East Chicago. Descriptive statistics were calculated to compare the populations in each Zone and the remainder of East Chicago. The methodology for the statistical analyses used in this report is summarized in Appendix D.

A total of 5,587 children <6 years of age² were tested in East Chicago during 2005-2015 (Table 1). Overall, half were female. An equal percentage of children, nearly 30%, were less than or equal to 24 months of age and 25-48 months of age. Forty percent were black and almost 49% were Medicaid recipients (Table 1). While a child may have been tested more than once per year during the 11-year period, this analysis includes only one test per child per year (Appendix D). However, a child may have been tested in multiple years.

There were a total of 6,920 blood lead test results from these 5,587 individual children for the time period of this analysis: 2005-2015 in East Chicago (overall including Zones 1, 2, 3, and Other East Chicago). The data were stratified by year to evaluate the number of tests per year, and the number and percent of tests that were ≥ 5 and ≥ 10 $\mu\text{g}/\text{dL}$ in Zones 1, 2, and 3, and the remainder of East Chicago ("Other East Chicago"), as shown in Table 2 and Figure 2. Over the 11-year period, the percentage of blood lead tests that were ≥ 5 and ≥ 10 $\mu\text{g}/\text{dL}$ decreased, consistent with the statewide trend (Table 3).

Although the number of blood lead tests fluctuates from year to year, there was an overall downward trend in the number of children <6 years of age tested for blood lead levels (Figure 1). The highest number of blood lead

² Rule 410 of Indiana Administrative Code Section 29-1-6 uses children less than 7 years of age as the target population. Whereas, CDC uses children less than 6 years of age as the criteria, which is the age cut-off used in the analysis for this report.

tests was 849 in 2008 and the lowest was 411 in 2014. During this period there was also a similar downward trend in the number of children <7 years of age tested for blood lead levels, beginning in 2012 (Table 3).

The odds of having a blood lead test result ≥ 5 and ≥ 10 $\mu\text{g}/\text{dL}$ were calculated for each Zone and compared to Other East Chicago (not including Zones 1, 2, or 3) and adjusted for age group and year of blood lead test (Table 4). Compared to the remainder of East Chicago, children had statistically significant higher odds of having BLLs ≥ 5 $\mu\text{g}/\text{dL}$ if they lived in Zone 1 (Odds Ratio (OR) = 2.93; 95% CI: 2.32-3.69) or Zone 2 (OR: 2.86; 95% CI: 2.05-4.00) and of having BLLs ≥ 10 $\mu\text{g}/\text{dL}$ if they lived in Zone 1 (Odds Ratio (OR) = 2.65; 95% CI: 1.59-4.42) or Zone 2 (OR: 3.09; 95% CI: 1.62-5.90). However, the odds of having BLLs ≥ 5 or ≥ 10 $\mu\text{g}/\text{dL}$ for children living in Zone 3 were not statistically significantly different from those living in the remainder of East Chicago (OR: 0.94; 95% CI: 0.68-1.30) and (OR: 1.79; 95% CI: 0.94-3.38), respectively (Table 4).

Table 1. Sociodemographic Characteristics of Children (less than 6 years old) with a Blood Lead Test between 2005-2015, by Geographic Area

	WCHC¹ (Zone 1)		Calumet (Zone 2)		East Calumet (Zone 3)		Other East Chicago		Total East Chicago	
	N	%	N	%	N	%	N	%	N	%
Sex										
Female	159	45.7	81	50.3	153	46.7	2,346	49.4	2,739	49.0
Male	183	52.6	77	47.8	168	51.2	2,344	49.4	2,772	50.0
Unknown	6	1.7	*	1.9	7	2.1	60	1.3	76	1.0
Age (months)										
0 to 24	87	25.0	52	32.3	102	31.1	1,403	29.5	1,644	29.4
25 to 48	111	31.9	36	22.4	104	31.7	1,322	27.8	1,573	28.1
49 to <72	150	43.1	73	45.3	122	37.2	2,025	42.6	2,370	42.4
Race										
Black	233	67.0	118	73.3	142	43.3	1,718	36.2	2,211	40.0
White	21	6.0	11	6.8	68	20.7	666	14.0	766	13.7
Other	5	1.4	*	0.6	8	2.4	211	4.4	225	4.0
Unknown	89	25.6	31	19.3	110	33.5	2,155	45.4	2,385	42.7
Medicaid Status										
Yes	180	51.7	90	55.9	162	49.4	2,285	48.1	2,717	48.6
No	69	19.8	48	29.8	99	30.2	1,163	24.5	1,379	24.7
Unknown	99	28.5	23	14.3	67	20.4	1,302	27.4	1,491	26.7
Total tested	348		161		328		4,750		5,587	

¹ WCHC: West Calumet Housing Complex

* Redactions applied to cell counts less than 5

Figure 1. Total number of blood lead tests for children less than 6 years of age, by year (East Chicago, 2005-2015)

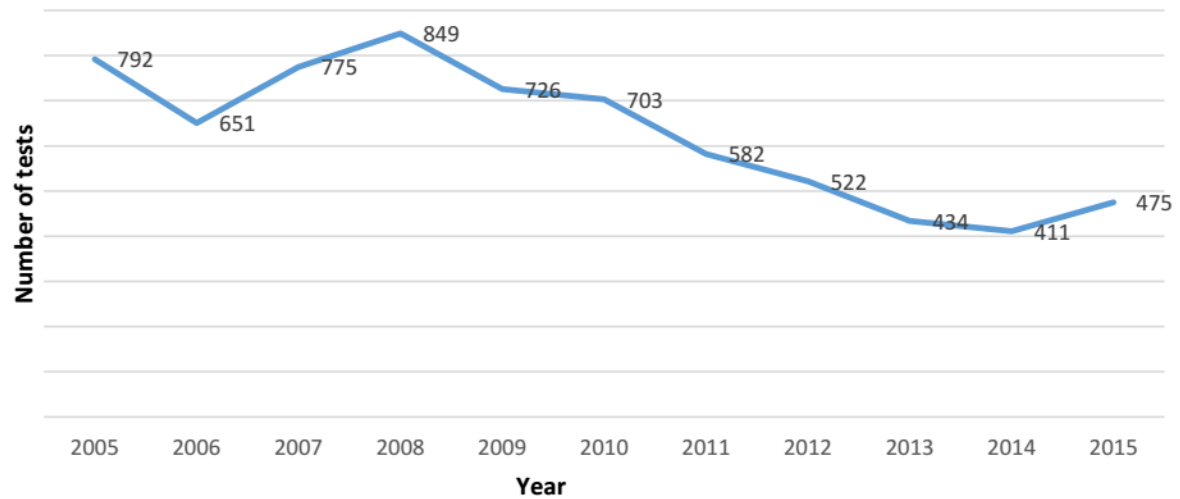


Table 2. Number of Blood Lead Tests for Children (Ages < 6 years old) and Number and Percent of Tests with Blood Lead Levels ≥ 5 $\mu\text{g}/\text{dL}$ and ≥ 10 $\mu\text{g}/\text{dL}$, by Zone and Year, East Chicago: 2005-2015^{1,2,3}

Year	Zone 1 $\mu\text{g}/\text{dL}$			Zone 2 $\mu\text{g}/\text{dL}$			Zone 3 $\mu\text{g}/\text{dL}$			Other East Chicago $\mu\text{g}/\text{dL}$		
	Tests	≥ 5	≥ 10	Tests	≥ 5	≥ 10	Tests	≥ 5	≥ 10	Tests	≥ 5	≥ 10
	N	N (%)	N (%)	N	N (%)	N (%)	N	N (%)	N (%)	N	N (%)	N (%)
2005	69	28 (40.6)	7 (10.1)	35	12 (34.3)	*	40	8 (20.0)	*	648	110 (17.0)	22 (3.4)
2006	50	19 (38.0)	*	36	13 (36.1)	*	30	*	*	535	90 (16.8)	15 (2.8)
2007	38	15 (39.5)	*	20	12 (60.0)	5 (25.0)	57	*	*	660	124 (18.8)	11 (1.7)
2008	48	14 (29.2)	*	18	6 (33.3)	*	52	9 (17.3)	*	731	103 (14.1)	12 (1.6)
2009	39	9 (23.1)	*	23	7 (30.4)	*	48	7 (14.6)	*	616	64 (10.4)	7 (1.1)
2010	37	9 (24.3)	*	20	*	*	38	*	*	608	40 (6.6)	7 (1.2)
2011	35	6 (17.1)	*	14	*	*	31	*	*	502	39 (7.8)	6 (1.2)
2012	26	5 (19.2)	*	*	*	*	17	*	*	476	39 (8.4)	5 (1.1)
2013	20	*	*	5	*	*	18	*	*	391	22 (5.6)	5 (1.3)
2014	29	*	*	8	*	*	24	*	*	350	19 (5.4)	*
2015	46	8 (17.4)	*	13	*	*	27	*	*	389	28 (7.2)	*
Total	437	120 (27.5)	19 (4.4)	195	55 (28.2)	11 (5.7)	382	43 (11.3)	11 (3.0)	5,906	679 (11.5)	95 (1.6)

* Redactions applied to cell counts less than 5

¹ Includes both venous and capillary blood lead test results

² There were a total of 6,920 blood lead test results from 5,587 individual children for the time period of this analysis: 2005-2015 in East Chicago (overall including Zones 1, 2, 3, and Other East Chicago). While a child may have been tested more than once during the 11-year period, this analysis includes only one test per child per year.

³Note: Indiana Elevated Blood Lead Level (EBLL) Definition: Rule 410 of Indiana Administrative Code 29-1-6 defines “Elevated blood lead level” or “EBLL” as a blood lead level of ten (10) $\mu\text{g}/\text{dL}$ or higher. Indiana State Department of Health (ISDH) is currently in the rule promulgation process for changing the action level to the CDC reference level of 5 $\mu\text{g}/\text{dL}$. For purposes of this report, we show both values.

⁴ISDH, 2015. https://www.in.gov/isdh/files/Lead_Report_2015_w_reportable_disease.pdf

Table 3. Number of Blood Lead Tests for Children (Ages < 7 years old)* and Number and Percent of Tests with Blood Lead Levels ≥ 5 $\mu\text{g}/\text{dL}$ and ≥ 10 $\mu\text{g}/\text{dL}$, for the entire State of Indiana during the years 2005-2015

Year	Tests N	≥ 5 $\mu\text{g}/\text{dL}$ N (%)	≥ 10 $\mu\text{g}/\text{dL}$ N (%)
2005	43,685	5,362 (12.3)	985 (2.3)
2006	48,214	5,338 (11.1)	918 (1.9)
2007	65,361	6,833 (10.5)	1,125 (1.7)
2008	62,652	5,586 (8.9)	973 (1.6)
2009	59,871	5,127 (8.6)	792 (1.3)
2010	61,563	4,136 (6.7)	682 (1.1)
2011	59,900	3,793 (6.3)	585 (1.0)
2012	53,265	3,034 (5.7)	494 (0.9)
2013	48,102	2,323 (4.8)	420 (0.9)
2014	40,811	1,766 (4.3)	289 (0.7)
2015	41,267	1,727 (4.2)	355 (0.9)
Total	584,691	45,025 (7.8)	7,618 (1.3)

* The data is from the 2015 ISDH Report- Childhood Lead Surveillance- Report Environmental Public Health Division Lead & Healthy Homes Program- 10 Years of Childhood Blood Lead Level Data in Indiana. Indiana State Department of Health. Available at https://www.in.gov/isdh/files/Lead_Report_2015_w_reportable_disease.pdf
Note that the age range for the ISDH report (<7 years old) is one year older than the age range the CDC/NCEH used in the analysis of East Chicago data (<6 years old). The ISDH Report incorrectly listed the age range as being <6 years old.

Table 4. Odds Ratio (OR) and 95% Confidence Intervals (CI) for Blood Lead (BL) Test Results ≥ 5 and ≥ 10 $\mu\text{g}/\text{dL}$ in Children (<6 years old) by Zone, East Chicago (2005-2015)¹

	WCHC (Zone 1)	Calumet (Zone 2)	East Calumet (Zone 3)	Other East Chicago (reference group)	Total
BL <5 $\mu\text{g}/\text{dL}$	317	140	339	5227	6023
BL ≥ 5 $\mu\text{g}/\text{dL}$	120	55	43	679	897
Chi-sq. p-value ²	<0.0001	<0.0001	0.887		
Crude OR (95% CI)	2.91 (2.33-3.65)	3.02 (2.19-4.17)	0.98 (0.70-1.35)		
Age-adjusted OR ³ (95% CI)	2.93 (2.32-3.69)	2.86 (2.05-4.00)	0.94 (0.68-1.30)		
BL <10 $\mu\text{g}/\text{dL}$	418	184	371	5811	6784
BL ≥ 10 $\mu\text{g}/\text{dL}$	19	11	11	95	136
Chi-sq. p-value ²	<0.0001	<0.0001	0.062		
Crude OR (95% CI)	2.78 (1.68-4.56)	3.66 (1.93-6.94)	1.81 (0.96-3.42)		
Age-adjusted OR ³ (95% CI)	2.65 (1.59-4.42)	3.09 (1.62-5.90)	1.79 (0.94-3.38)		
					6920

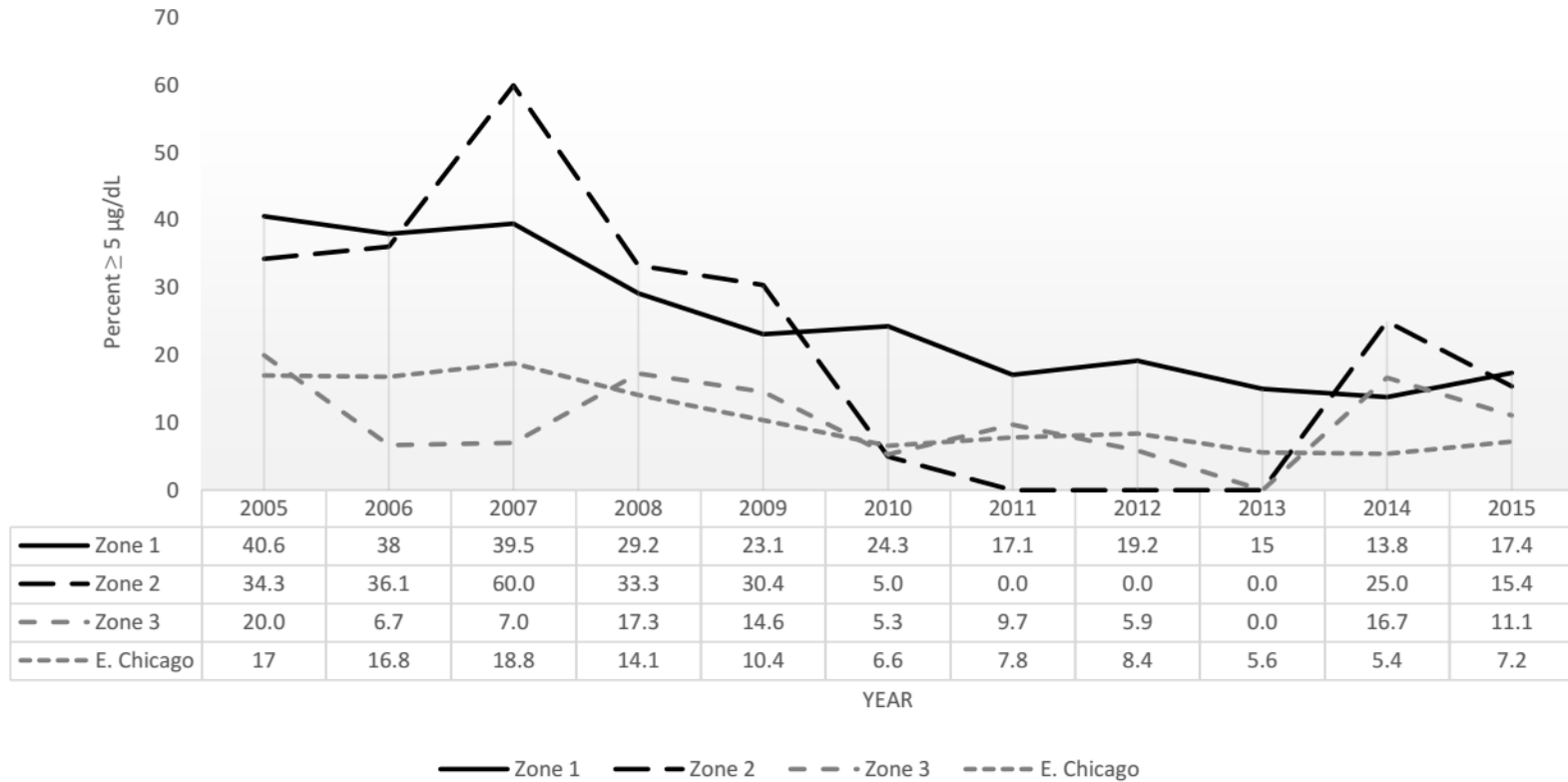
¹ There were a total of 6,920 blood lead test results from 5,587 children for the time period of this analysis: 2005-2015 in East Chicago (overall)

² p-values from chi-square tests of equal proportions comparing each zone to Other East Chicago (not including Zones 1, 2, or 3). Chi square is a calculation used to determine how closely the observed data fit the expected data. The smaller the p-value, the more likely that there is a difference in the comparison.

³ Cochran-Mantel-Haenszel Estimate adjusted for age and year of test

⁴ Note: Indiana Elevated Blood Lead Level (EBLL) Definition: Rule 410 of Indiana Administrative Code 29-1-6 defines “Elevated blood lead level” or “EBLL” as a blood lead level of ten (10) $\mu\text{g}/\text{dL}$ or higher. Indiana State Department of Health (ISDH) is currently in the rule promulgation process for changing the action level to the CDC reference level of 5 $\mu\text{g}/\text{dL}$. For purposes of this report, we show both values.

Figure 2. Percent of blood lead tests ≥ 5 $\mu\text{g}/\text{dL}$ by Zone and Year, 2005-2015



* E. Chicago in this figure refers to East Chicago outside of Zones 1, 2, and 3

Environmental Data

ATSDR plans to do an extensive review of possible environmental lead sources in this area and report that information in a separate document. We will review the possible sources listed below.

Soil contamination

The USS Lead plant ceased operations in 1985. Since then, IDEM, the Indiana Air Pollution Control Board (IAPCB), and the EPA Superfund Remedial and the Emergency Response Programs have investigated soil lead contamination on-site and also within the West Calumet (Zone 1), Calumet (Zone 2), and East Calumet (Zone 3) neighborhoods over several rounds of investigation.

The investigations found soil lead levels high enough to require immediate remediation for a number of residential properties in 2006 and 2011. A more extensive effort to remove lead-contaminated soil began in September 2016 and is currently on-going³.

Table 5 shows surface soil lead levels for sampling conducted during 2014-2017 by EPA in each of the Neighborhoods/Zones. The results of limited soil sampling for lead concentrations at several background locations in East Chicago that were not impacted by lead contamination for the USS Lead site are shown as a comparison. The results show that the median (50th percentile) level of lead in surface soil was significantly higher in each of these neighborhoods, compared to the background locations within East Chicago. Comparison of the levels within each of the neighborhoods shows that the WCHC (Zone 1) generally has higher levels of lead contamination in surface soils than either of the other neighborhoods. Calumet (Zone 2) levels are higher than East Calumet (Zone 3).

The fact that the housing complex was built on the footprint of the former Anaconda Smelting facility, a known source of lead contamination, could explain the higher soil lead levels in WCHC/Zone 1. Zones 2 and 3 could have been impacted by airborne lead deposition of historical smelter emissions or the use of contaminated fill material. Soil boring of some properties in Zones 2 and 3 show higher concentrations in subsurface soil and also the presence of “slag-like” material in the soil. These observations provide evidence that lead-containing slag had been used as fill in this area (EPA, 2012; Geochemical Solutions, 2004; Techlaw, 2004).

³ The EPA documents on the USS Lead site detailing the soil sampling and remediation activities are available at <https://www.epa.gov/uss-lead-superfund-site>.

Table 5. Comparison of Lead Concentration (ppm) in Surface Soils (0-6" depth) by Neighborhood/Zone

Neighborhood/Zone	N	Lead Concentration (ppm)					
		Mean	GM (95% CI)*	Percentiles			Maximum
				25 th	50 th	75 th	
WCHC (Zone 1)	94	2,465	1,057 (826-1,353)	416	862	2,420	45,000
Calumet (Zone 2)	1,261	512	379 (363-396)	242	411	630	17,500
East Calumet (Zone 3)	558	424	337 (320-354)	238	340	462	10,000
East Chicago Background*	9	-	-	-	77.6	-	112

*Site-specific background sampling of East Chicago locations unaffected by urban fill or backfill material from USS Lead site (EPA Remedial Investigation report, 2012)

+ GM = geometric mean; 95% CI = 95% confidence interval (lower, upper) on the statistic

Indoor dust

Lead in indoor dust can come from outdoor sources, such as contaminated soil, or from indoor sources, such as lead-based paint. In Fall 2016, ISDH conducted XRF testing of interior surfaces in the WCHC and found no indication of lead on painted surfaces in the housing complex (ISDH, 2016). EPA also performed indoor dust sampling, the results of which will be included in separate document.

Drinking water

These neighborhoods are supplied by municipal water from the City of East Chicago which is sourced from Lake Michigan. Since groundwater is not used as a source of drinking water, it is unlikely that lead in soil has impacted the drinking water. Testing records indicate that the City of East Chicago has been in compliance with the Federal Lead and Copper Rule testing requirements. However, the City of East Chicago Water Utilities Department has estimated that more than 83% of its residential water service lines across the distribution system may include leaded pipes. In addition, homes built before 1986 are more likely to have lead fixtures and lead-based solder, therefore corrosion of plumbing materials may also be a source of exposure.

Air emissions

Limited information on air emissions is available from the time when USS Lead was in operation. In 1985, when the plant was still operating, IDEM collected air monitoring data on the plant property and in the community. Most of the time, the wind blows from the property towards the northeast. The 1985 quarterly average for air lead, about ¼ mile downwind of the plant, was 1.3 µg/m³ [ATSDR 1994]. As a comparison, between 1978 and 2008, the National Ambient Air Quality Standard (NAAQS) based on quarterly averages was 1.5 µg/m³. In 2008, EPA lowered the air quality standards for lead to reflect the latest epidemiological findings and to better provide health protection for at-risk groups, including children. The current lead standard is 0.15 µg/m³. IDEM has operated two new source-oriented monitors near lead-emitting steel industries of East Chicago since the NAAQS was revised. Monitoring near the former USS Lead site is not required as it is no longer an active air emission source. Air monitoring data show that the East Chicago area has been in attainment of the previous NAAQS and the revised NAAQS since it was implemented.

Discussion

Evaluation of blood lead testing in the WCHC and Calumet neighborhoods during the 2005-2015 time period shows that beginning 2008, the number of children younger than 6 years of age that were tested showed a steady decline across the rest of East Chicago. After 2011, a similar decline in the number of blood testing was observed across the state of Indiana (ISDH, 2015) and across the U.S. (CDC, 2015). The number of children <6 living in East Chicago dropped 3% between 2000 and 2010, according to the US Census data. However, this slight decrease in population does not account for the decline in children tested. The reasons for that decline are not clear, but these data indicate the need to prioritize targeted testing of children in this community.

Based on the analysis for the period from 2005-2015, children living in the WCHC (Zone 1) and the adjacent Calumet neighborhood (Zone 2), immediately to the east, had a higher percentage of blood lead tests $\geq 5 \mu\text{g}/\text{dL}$ than children in the remainder of East Chicago. Although there are many potential sources of exposure to lead, the high surface soil levels in WCHC (Zone 1) and Calumet (Zone 2) are a source for lead exposure that could contribute to this difference. Therefore, EPA's assessment and remediation of properties within these areas is important to reduce exposure. ATSDR is reviewing environmental sampling results for soil, indoor dust, and air to evaluate exposure to the community, to identify needed public health actions, and to update the 2011 Public Health Assessment.

Children can be exposed to lead from multiple sources, including lead-based paint, soil, dust, air, water, foods, and consumer products. Exposure to these sources and the impact on blood lead levels can vary by individual. Therefore, it is difficult to attribute exposure to a specific source(s).

Given the level of lead contamination in these neighborhoods, particularly in WCHC (Zone 1), the potential for exposure to lead from residential soil was greater than for other areas of East Chicago that were not affected by industrial sources. ATSDR will complete an extensive review of past and present environmental lead sources in another report. Although we may be able to identify potential exposure sources and make recommendations on reducing exposure, we cannot determine the magnitude of the contribution of specific sources to the blood lead levels in these neighborhoods.

The effects of lead exposure are generally irreversible, with negative impacts on attention-related behaviors, IQ, academic achievement, as well as effects on the cardiovascular, immunological, and endocrine systems. The focus of public health agencies is on primary prevention of lead exposure. Identifying children and pregnant women who are at risk for lead exposure is critical to developing effective intervention strategies.

Data Limitations

Data selection: The blood lead test data used in the analysis included only the data that could be linked to a child's address and geocoded. These analyses did not include data for children with missing addresses and for those whose addresses that could not be geocoded. However, the high address match rate for geocoding for East Chicago reduces the likelihood that missing addresses had a serious effect on the results. The results are based on a convenience sample of children who received blood lead tests between 2005-2015 and may not represent the entire population.

Conclusions

Conclusion 1: The percentage of young children (less than 6 years of age) living in the residential areas of the USS Lead site and across the rest of East Chicago have had a declining percentage of blood lead levels greater than or equal to (\geq) 5 $\mu\text{g}/\text{dL}$ ⁴ between 2005 and 2015.

Basis for Conclusion: From 2005 to 2015, the percentage of blood lead tests results that are greater than the current CDC reference level of 5 $\mu\text{g}/\text{dL}$ have been gradually declining within each of Calumet neighborhoods, across all of East Chicago, and across all of Indiana.

Conclusion 2: The number of blood lead tests for children younger than 6 years of age tested for blood lead across the City of East Chicago declined from 2008 to 2015. This decline has occurred in an area where children are at risk for higher blood lead levels from high soil lead levels and other possible sources of lead exposure. This decline is similar to the overall decline in blood lead testing among children in Indiana as a whole.

Basis for Conclusion: The average number of blood lead tests for young children (less than 6 years of age) in all of **East Chicago** during the 11-year period (2005 to 2015) declined from 2008 through 2014 (Figure 1). A similar decline in the number of tests was also found within the residential areas of the USS Lead site (i.e. West Calumet Housing Complex, Calumet neighborhood, and East Calumet neighborhood). The number of children <6 years old living in East Chicago dropped 3% between 2000 and 2010, according to the US Census data. However, this slight decrease in population does not account for the decline in children tested. After 2011, the number of blood lead tests conducted also declined across the entire state of Indiana (ISDH, 2015).

Conclusion 3: Young children (less than 6 years of age) living in the **West Calumet Housing Complex (WCHC) (Zone 1)** had a higher percentage of blood lead levels greater than or equal to (\geq) 5 $\mu\text{g}/\text{dL}$ between 2005 and 2015, compared with other areas of East Chicago (not including Zones 1,2 and 3).

Basis for Conclusion: Over the period of 2005-2015, a child living in WCHC (Zone 1) had nearly a three times greater chance of having a blood lead level \geq 5 $\mu\text{g}/\text{dL}$ (Odds Ratio = 2.93), compared to a child living in Other East Chicago (not in Zones 1, 2, or 3). During that time, 27.5% of the blood lead test results were \geq 5 $\mu\text{g}/\text{dL}$, compared to 11.5% for the remainder of East Chicago. Also during that time 4.4% of the blood lead results were \geq 10 $\mu\text{g}/\text{dL}$, compared to 1.6% for the remainder of East Chicago.

Conclusion 4: Young children living in the **Calumet neighborhood (Zone 2)** have also experienced a similar higher percentage of blood lead levels \geq 5 $\mu\text{g}/\text{dL}$ as children living in WCHC, compared to the other areas of East Chicago (not including Zones 1,2 and 3).

Basis for Conclusion: Over the period of 2005-2015, a child living in the Calumet neighborhood (Zone 2) also had almost a three times greater chance of having a blood lead level \geq 5 $\mu\text{g}/\text{dL}$ (Odds Ratio = 2.86), compared a child living in Other East Chicago (not including Zones 1,2, and 3). During that time, 28.2% of the blood lead tests were \geq 5 $\mu\text{g}/\text{dL}$, compared to 11.5% for the remainder of East Chicago. Also during that time, 5.7% of the blood lead tests were \geq 10 $\mu\text{g}/\text{dL}$, compared to 1.6% for the remainder of East Chicago.

⁴ In 2012, the Centers for Disease Control and Prevention (CDC) updated its recommendations on children's blood lead levels. Prior to that, CDC used 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) as the "level of concern" to identify children who require case management. A reference level of 5 $\mu\text{g}/\text{dL}$ is currently used to evaluate children who have been exposed to lead, based on the 97.5th percentile of the distribution of national blood lead levels in children (National Health and Nutrition Examination Survey (NHANES)).

Conclusion 5: Children living in **the East Calumet neighborhood (Zone 3)** had a similar percentage of blood lead levels ≥ 5 $\mu\text{g}/\text{dL}$, but a higher percentage of blood lead levels ≥ 10 $\mu\text{g}/\text{dL}$, compared to other areas of East Chicago (not including Zones 1, 2, and 3).

Basis for Conclusion: Over the period of 2005-2015, a child living in the East Calumet neighborhood (Zone 3) had a similar chance of having a blood lead level ≥ 5 $\mu\text{g}/\text{dL}$ (odds ratio = 0.94), compared to a child living in Other East Chicago. During that time, 11.3% of the blood lead tests were ≥ 5 $\mu\text{g}/\text{dL}$, compared to 11.5% for the remainder of East Chicago. Also during that time, 3.0% of the blood lead tests were ≥ 10 $\mu\text{g}/\text{dL}$, compared to 1.6% for the remainder of East Chicago.

Recommendations

- 1) For ISDH, ECHD, and CDC/ATSDR to continue encouraging blood lead testing of all children <6 years of age in living East Chicago, but particularly in the neighborhoods that have been demonstrated to have been impacted by the lead contamination from the operations within the USS Lead Superfund site.
- 2) For ISDH, ECHD, CDC/ATSDR, and the Region 5 Pediatric Environmental Health Specialty Unit (PEHSU) continue to support healthcare provider education opportunities for this community.
- 3) For ISDH to ensure that any child with a BLL \geq the CDC blood lead reference value (currently 5 $\mu\text{g}/\text{dL}$) from East Chicago is entered into case management, including follow-up blood lead testing at regular intervals according to CDC guidelines. This includes ISDH coordination with HUD and local health agencies to ensure the same follow-up is provided for those children who may have left East Chicago due to the WCHC closure.
- 4) For the City of East Chicago and ISDH to make residents aware of funding opportunities to address lead hazards in their homes.
- 5) For ISDH, ECHD, CDC/ATSDR, Indiana Department of Education, and the Region 5 Pediatric Environmental Health Specialty Unit (PEHSU) to provide information to parents of children with a BLL \geq the CDC Blood lead reference value and school officials and teachers in East Chicago about the risks of lead exposure to cognitive development and make them aware of the accommodations their children may need to be effective learners.

Public Health Action Plan

- 1) ATSDR will continue to work with ISDH and ECHD to encourage blood lead testing of children through targeted public messaging. The rate of BLLs ≥ 5 $\mu\text{g}/\text{dL}$ has been gradually declining nationally. That trend can also be seen for East Chicago, as well as for the WCHC, Calumet, and East Calumet Zones. However, it is still important to continue public outreach to encourage testing of young children throughout the residential areas impacted by contamination from USS Lead and other smelter facilities. There is a specific need to target testing of children in the Calumet neighborhood where the rates of BLLs ≥ 5 $\mu\text{g}/\text{dL}$ and environmental contamination remain a concern until remediation has been completed.
- 2) ISDH, ECHD, ATSDR, and the Region 5 PEHSU will develop on-going healthcare provider education programs to encourage blood lead testing of all young children throughout East Chicago. These agencies

participated in a Medical Grand Rounds event, sponsored by St. Mary's Hospital on February 4, 2017, which focused on lead education and the USS Lead investigation.

- 3) ISDH, ECHD, HUD, and the East Chicago Housing Authority will coordinate on the follow-up through case management protocols for children that have a BLL ≥ 5 $\mu\text{g/dL}$ who formerly living in the West Calumet Housing Complex. This effort would include children who moved within East Chicago, those moving elsewhere within the state of Indiana, or those who have moved out of state.
- 4) The City of East Chicago will promote public awareness of resources to abatement residential lead hazards, particularly grants available through the East Chicago Redevelopment Commission to be used for rehabilitation of owner-occupied residences. Such efforts will reduce the risks of future lead exposures to children. ISDH has also received funding through HUD and Medicaid to be used to address residential lead hazards.
- 5) ISDH, ECHD, and CDC/ATSDR will coordinate to develop an outreach effort targeted to families with young children and educators in East Chicago to provide information about the risks of lead exposure to cognitive development and to encourage development of a program to address the educational needs of lead-exposed children.

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Appendices

Appendix A- Property map of Former Anaconda Lead Smelter and Current West Calumet Housing Complex (WCHC)

Appendix B- Historical Aerial Photographs of Former Anaconda Lead Smelter/Refinery and Surrounding Residential Areas

Appendix C- Map showing areas of lead contamination assessment in soil

Appendix D- Methodology for statistical evaluation of 2005-2015 blood lead data

Appendix A: International Lead Refinery/Anaconda Lead Products

Pulverizing Mill & White Lead Storage

White Lead
Plant

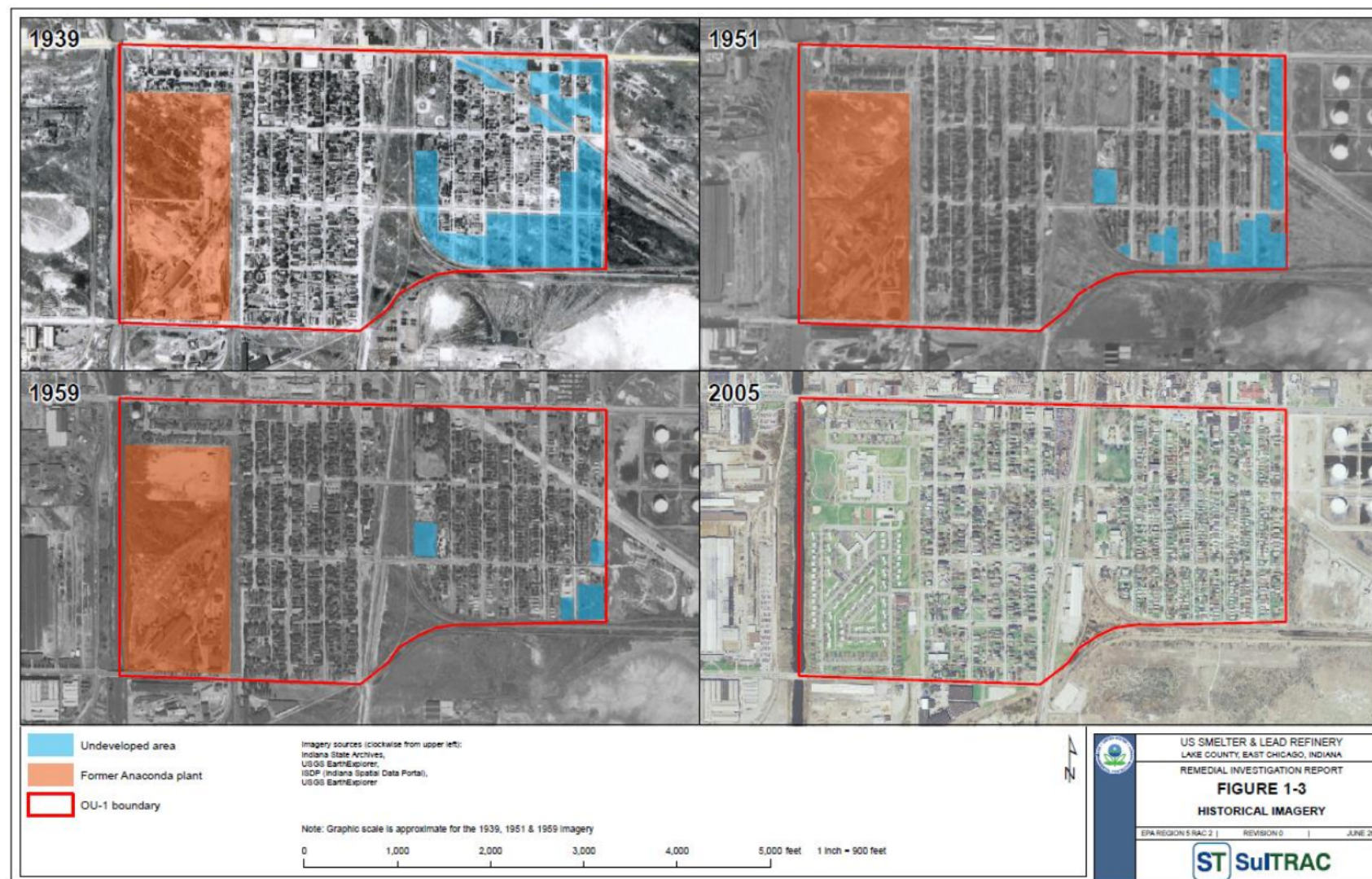
Lead Refinery



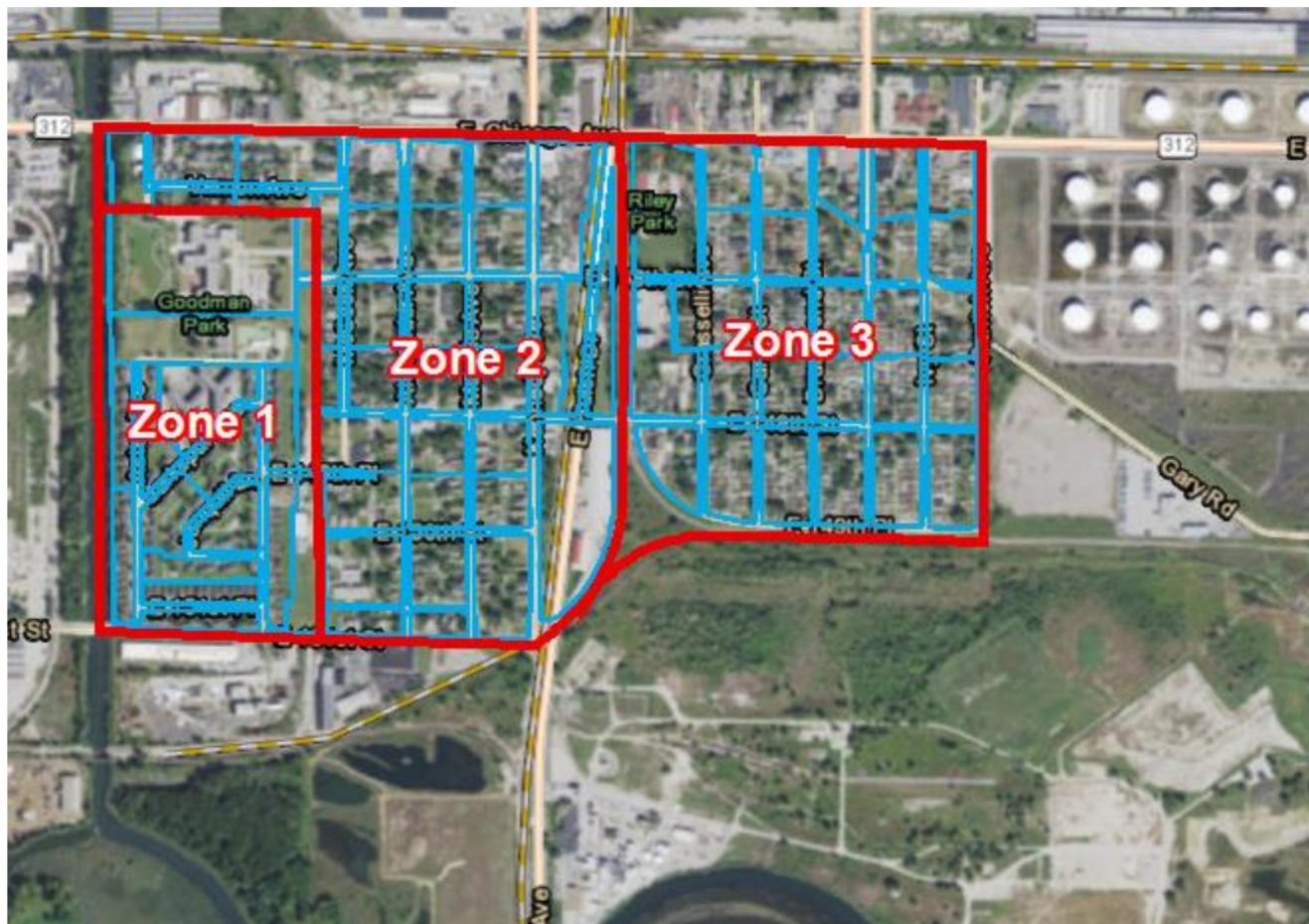
Carrie Gosch
Elementary School

West Calumet Housing Complex

Appendix B- Historical Aerial Photographs of Former Anaconda Lead Smelter/Refinery and Surrounding Residential Areas (from EPA Remedial Investigation Report)



Appendix C- EPA map showing areas of lead contamination in soil
(<https://www.epa.gov/uss-lead-superfund-site>)




Appendix D- Methodology for statistical evaluation of 2005-2015 blood lead data

The Indiana State Department of Health (ISDH) provided all blood lead test results for children less than 6 years of age in their database for 2005 through 2015. These data were limited to include only those tests that were in Lake County or had a missing county variable. There were no identifiers for individual patients, so a matching algorithm was applied to assign each individual an ID number. Matches were determined using a hierarchical matching process. Each observation was checked against the remainder of observations and considered a match if: 1) the billing ID variable was an exact match; 2) the first name, last name, and date of birth were an exact match; 3) a concatenation of the first two letters of the first name, first two letters of the last name, sex, and date of birth were an exact match; or 4) a concatenation of the first two letters of the first name, first two letters of the last name and date of birth were an exact match. Observations that matched based on the concatenated variables were then manually reviewed to ensure that they were in fact the same individual. When address data or sex codes were missing, they were imputed if possible based on the other observations for that individual. Finally, the data were limited to one test per child per year retaining the highest venous test, or, where there were no venous tests, the lowest capillary or unknown test. The dataset used for geocoding and analysis contained 41,650 blood lead test results from 34,347 unique individuals.

Data were geocoded using a GIS mapping tool (TomTom®, 2012). The initial match rate was 89% (36,901 matched). After manual re-matching, an additional 248 addresses were matched and approximately 90% of the observations were mapped to a geographic location. Among addresses identified by either the city ("East Chicago") or zip code ("46312") variable, approximately 97% of the addresses were mapped to a geographic location. Once addresses were geocoded, each observation was assigned an indicator if it was within the West Calumet Housing Complex (Zone 1), the Calumet neighborhood (Zone 2), the East Calumet neighborhood (Zone 3), or the remainder of the city of East Chicago ("Other East Chicago") which served as the comparison).

Descriptive statistics comparing population sociodemographic characteristics (sex, age group, race, Medicaid status), and the number of tests by sample type (venous, capillary or unknown) and year, were calculated within each of the three zones as well as for the rest of East Chicago. Data were stratified by year to determine whether the sample type or the percentage of tests ≥ 5 and ≥ 10 $\mu\text{g/dL}$ varied over time within each of the three zones or in the remainder of East Chicago. Odds Ratios (ORs) and 95% confidence intervals (CI) were calculated to determine whether the odds of having tests ≥ 5 $\mu\text{g/dL}$ or ≥ 10 $\mu\text{g/dL}$ differed by zone, compared to the remainder of East Chicago (Other East Chicago not including Zones 1,2, or 3). All statistical analyses were conducted using SAS® v. 9.3 (SAS Institute, Cary, NC).

CAG Letter to EPA Re Interior Dust



East Chicago Calumet Coalition Community Advisory Group
USS Lead Superfund Site
P.O. Box 2321
East Chicago, IN 46312

April 27, 2018

Ms. Cathy Stepp, Regional Administrator, Region 5
Mr. Doug Ballotti, Director, Superfund Division, Region 5
U.S. Environmental Protection Agency – Region 5
Ralph Metcalfe Federal Building
77 West Jackson Blvd.
Chicago, IL 60604-3590

Re: USS Lead Superfund Site: Lead and Arsenic Dust Sampling and Cleaning Protocol

Dear Regional Administrator Stepp and Mr. Ballotti,

The East Chicago Calumet Coalition Community Advisory Group (CAG) requests your prompt assistance in addressing an ongoing threat to human health at the USS Lead Superfund Site (Site) in East Chicago, Indiana. We want to ensure that the United States Environmental Protection Agency (USEPA) hears and addresses our concerns about the interior dust work plan, proposed by the potentially responsible parties (PRPs), before the agency approves the work plan. Neither USEPA nor the PRPs have provided to us despite our stated interest in this issue generally and the work plan specifically. We request that USEPA modify its lead and arsenic dust sampling and cleaning protocol to make it consistent with existing science and standards that exist for indoor lead dust. Despite USEPA Administrator Scott Pruitt's announcement that the Site required "immediate and intense action,"¹ residents at the USS Lead Site continue to be exposed to lead and arsenic in their homes.

¹ John J. Watkins, *EPA announces USS Lead Superfund site in East Chicago targeted for immediate, intense action*, THE NORTHWEST INDIANA TIMES (Dec. 8, 2017), http://www.nwitimes.com/news/local/lake/epa-announces-uss-lead-superfund-site-in-east-chicago-targeted/article_47d7b1ab-a4cb-5474-8bba-e165676d49a7.html; EPA, Superfund Sites Targeted for Intense and Immediate Action (December 7, 2017), <https://www.epa.gov/superfund/superfund-sites-targeted-immediate-intense-action>.

I. Introduction

There is no safe level of lead. In USEPA's own words, the indoor lead and arsenic contamination at the USS Lead Site poses "an imminent and substantial endangerment to public health, welfare, [and] the environment."² Where elevated levels of toxic lead or arsenic are present, USEPA knows that residents are at risk of "detrimental effects on almost every organ and system in the human body."³ Moreover, children are most vulnerable to these effects: the youngest residents of East Chicago are at risk of "nerve damage, liver damage, colic, anemia, brain damage, and death."⁴ Yet, USEPA does not seem to be taking seriously this significant exposure pathway; an EPA official actually noted, at a public meeting, that the interior work was really a "nicety" designed to close out the remediation for each home.⁵

Notably, the interior dust assessment and cleaning was not part of the Record of Decision (ROD) or any other public comment process, which means that residents have not had the opportunity to provide input on the approach and standard that USEPA has undertaken at the sites. USEPA and the PRPs entered into agreements for how to proceed, but the people most impacted by the contamination in their homes have had no say in the process. We want to draw your attention to four concerns:

- Hundreds of homes that may have indoor lead and arsenic dust at unsafe levels are excluded from the current testing program based on the fact that USEPA deemed that their soil does not require remediation, despite the fact that residents may have tracked contaminated soil into their homes, had dust blown in their homes due to excavations at neighboring properties, and experienced basement seepage that leaves contaminated dust behind.
- Even when homes are eligible for sampling, the existing interior action levels, and the implementation of the cleaning do not adequately protect residents from lead or arsenic because they do not comport with current science and do not consistently address all the dust in the home.

² Memorandum, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *ACTION MEMORANDUM — 4th AMENDMENT: Request for a Change in Scope and Ceiling Increase for the Time-Critical Removal Action at the U.S. Smelter and Lead Refinery Site, East Chicago, Lake County, Indiana*, 12 (Oct. 24, 2016), <https://sempub.epa.gov/work/05/929998.pdf>.

³ *Id.* at 8.

⁴ *Id.*

⁵ September 16, 2017 EPA Public Meeting, USS Lead Site, East Chicago, Indiana.

- The residents receive dust sampling reports that are useless because USEPA presents different measurements for pre- and post-cleaning; without an apples-to-apples comparison, residents cannot determine the effectiveness of a cleaning.
- The lead sampling contractors are not certified to perform this work in Indiana.

Even if the dust cleaning eliminated all the dust associated with the soil contamination, many of the homes also have lead-based paint. Although USEPA is not required to clean interior lead-based paint, it is expected to work with other government agencies to support lead-based paint abatement as a means to eliminate the risk: “EPA Regions should promote addressing interior paint risks through actions by others, such as HUD, local governments and health authorities, . . .”⁶ Also, USEPA should consider whether there is any exterior lead-based paint that might recontaminate the soil.⁷

II. USEPA should address indoor contamination in all residences on the USS Lead Site

Without any scientific backing and in disregard of the Superfund Lead Residential Sites Handbook,⁸ USEPA has decided not to sample and address indoor dust contamination at hundreds of homes on the USS Lead Site. USEPA has not and does not plan to require dust sampling or assessment at the homes where the exterior soil contamination levels did not rise above the action levels for remediation—400 ppm for lead and 26 ppm for arsenic. This approach is inconsistent with the Superfund Lead-Contaminated Residential Sites Handbook, even though the ROD and Statement of Work (SOW) indicate that they will comply with the Handbook.⁹ The Handbook provides:

⁶See USEPA, Superfund Lead-Contaminated Residential Sites Handbook, 50 (Aug. 2003), <https://www.epa.gov/superfund/lead-superfund-sites-guidance#residentialsites> (herein after “Superfund Lead-Contaminated Residential Sites Handbook”).

⁷ *Id.*

⁸ See USEPA, Superfund Lead-Contaminated Residential Sites Handbook, 50 (Aug. 2003), <https://www.epa.gov/superfund/lead-superfund-sites-guidance#residentialsites> (herein after “Superfund Lead-Contaminated Residential Sites Handbook”). Also, USEPA should evaluate the homes for the presence of any exterior lead-based paint that will recontaminate the soil. *Id.* While the State of Indiana has recently devoted some resources to lead abatement in East Chicago, it is not adequate to address the vast number of homes with lead paint even if it concentrates exclusively on the USS Lead Site residences.

⁹ USS Lead Superfund Site, Operable Unit 1 Record of Decision, 7 (2012), <https://semspub.epa.gov/work/05/446987.pdf>; Statement of Work for the Remedial Design and Remedial Action for Z1 and Z3, <https://semspub.epa.gov/work/05/919701.pdf>.

Lead in the environment can originate from many sources. In addition to soil, the main sources to consider when performing clean-up activities are interior and exterior LBP, lead-contaminated interior dust, drinking water, and occupational exposure resulting in subsequent contamination of homes. Generally, sources other than soil, exterior paint, dust, and tap water cannot be remediated by EPA in the course of residential lead cleanups.

Ultimately, the project managers should strive to address any unacceptable lead-exposure risks at the residence.¹⁰

The paramount goal of a Superfund site remedy is to protect human health. An effective remedy must entail indoor dust sampling and cleaning. The Handbook actually contemplates that USEPA would address interior dust at multiple points in the remediation process to reduce acute risks initially, assess changes in dust loading and concentration as the project continues, and then “active remediation of interior lead-contaminated dust.”¹¹ Here, the staged cleanup and ongoing groundwater contamination issues make a repeated assessment of the dust issues appropriate.

USEPA also draws an artificial line between properties, as though demolitions and excavations on a neighboring property would not be tracked into people’s homes, despite the close proximity of the homes.¹² The soil sampling that determined that the properties did not require remediation preceded the excavations at neighboring properties. Post-excavation sampling would likely reveal that residents have tracked in contaminated dust or that dust has come in through windows. Indeed, at one residence, USEPA determined that the back yard needed remediation but the front yard did not, but when it conducted interior sampling, the highest readings were at the front door (and no lead paint was present).¹³ In another situation at the Site, a pregnant resident insisted on indoor testing due to nearby excavation activities, even though her property did not exceed the threshold of 400 ppm of lead that triggers remediation; she learned that her indoor dust exceeded the threshold of 316 ppm. USEPA

¹⁰ Superfund Lead Residential Sites Handbook, 49 (2003), available at <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100K3UN.PDF?Dockkey=P100K3UN.PDF>

¹¹ Id. at 52.

¹² See e.g. von Lindern IH, Spalinger SM, Bero BN, Petrosyan V, von Braun MC, “The influence of soil remediation on lead in house dust,” *Science Total Environ* (2003); City of Detroit Task Force Recommendations for Improving Demolition Safety and Health Standards (2018).

¹³ See attached soil sampling results and interior dust sampling results (“Note 13 Attachments”).

should not make assumptions about interior dust levels based on exterior soil samples, but it should sample them.

Instead of testing the soil or supporting its decision with science, USEPA has dismissed valid resident concerns with casual remarks: “People have likely removed the dust in their normal household cleaning.”¹⁴ As USEPA knows, this environmental justice community has been disproportionately impacted by the long-term exposure to toxins; removing some sources of lead and arsenic in the community, while leaving others and downplaying their importance, does not promote environmental justice.

USEPA should require the PRPs to sample the interior of all homes in the USS Lead Site and promptly clean all homes with lead dust levels exceeding 10 ug/ ft². The next section explains in more detail the inappropriateness of the current standards.

III. USEPA should modify the interior dust protocols and cleaning practices at this site to make them protective of human health

Despite the undisputed risk to this environmental justice community, USEPA’s current interior dust sampling and cleaning protocols at the Site do not adequately protect human health as required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP).

USEPA created the first sampling system in East Chicago in the context of a short-term emergency. After finding lead and arsenic levels in the exterior soil that far exceeded the emergency removal standard of 1200 ppm for lead and 68 ppm for arsenic, residents in the West Calumet Housing Complex located in Zone 1 were relocated.¹⁵ The goal of the cleanup protocol at the time was “to sample all of the units in the Housing Complex within a relatively short time frame,” and the USEPA needed “a rapid collection of samples using equipment that was readily available and did not need extensive decontamination procedures.”¹⁶ This plan was

¹⁴ USEPA Public Meeting, April 7, 2018.

¹⁵ Memorandum, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *ACTION MEMORANDUM — 5th AMENDMENT: Request for a Change in Scope and Ceiling Increase for the Time-Critical Removal Action at the U.S. Smelter and Lead Refinery Site, East Chicago, Lake County, Indiana*, 5 (Mar. 6, 2017), <https://semspub.epa.gov/work/05/933033.pdf>.

¹⁶ Decl. of Mark Johnson, Ex.B, Mem. in Opp’n to Applicants’ Mot. to Intervene, *United States v. Atlantic Richfield Company*, No. 2:14-cv-00312, 14 (N.D. Ind. 2016), <https://semspub.epa.gov/work/05/937050.pdf>.

designed to mitigate the exposure to lead and arsenic in the short-term until around the residents in West Calumet Housing Complex would be relocated.

Although the situation in East Chicago has transformed into a long-term emergency coupled with a prolonged cleanup for community members who will remain residents in Zone 2 and 3 at the Site, USEPA has failed to revise and adapt its protocol to adequately protect public health and welfare. The USS Lead Site interior dust protocols are flawed because they: (1) do not reflect current science on evaluating human exposure to dust, and (2) do not provide consistent measurements for accountability. We also want to note that even if the existing interior dust cleanup plan was appropriate, in practice, residents have experienced inconsistent implementation of the dust cleaning; several people have noted that contractors have done a poor job or skipped parts of the home. Moreover, the cleanups do not take into account the repeated exposure to dust through basement seepage and ongoing excavation at the site. USEPA should take this opportunity to make the cleanup consistent with the current standards issued by the Department of Housing and Urban Development (HUD), especially considering that, in December 2017, the U.S. Court of Appeals for the Ninth Circuit required USEPA to update its dust hazard standards.¹⁷

A. Selection of lead and arsenic dust standards

1. Lead dust standard

When the Region 5 Agency for Toxic Substances and Disease Registry (ATSDR) developed the interior dust protocol for the USS Lead Site, it claimed “there was not a specific guidance document available that covered all aspects of the sampling, analysis, and evaluation of contaminants in indoor dust data.”¹⁸ That was not true. For example, ATSDR had partnered with the Missouri Department of Health and Senior Services in 2003 to develop a site-specific standard at the Herculaneum Lead Smelter Site; in that report, ATSDR readily relied on HUD guidance and the on-site conditions and exposures to develop a 20 ug/ ft².¹⁹ In addition, the Superfund Lead Residential Sites Handbook provides some guidance.

¹⁷ See *In re A Community Voice*, No. 16-72816 (9th Cir. Dec. 27, 2017) (*A Community Voice*).

¹⁸ Decl. of Mark Johnson, *Atlantic Richfield*, No. 2:14-cv-00312 at 14.

¹⁹ ATSDR and Missouri Department of Health and Senior Services, “Determination if site-specific interior dust cleanup levels are sufficiently protective of public health,” Herculaneum Lead Smelter (December 2003); available at <http://health.mo.gov/living/environment/hazsubstancesites/pdf/FinalHercDustConsult.pdf>

Moreover, ATSDR relied on guidance documents and sampling plans from *other* site investigations to develop East Chicago’s clean-up protocol.²⁰ The protocol was built around the Integrated Exposure Uptake Biokinetic model (IEUBK).²¹ ATSDR and USEPA relied on the IEUBK’s default assumption “that the concentration of lead in indoor dust is 70% of the concentration of lead in outdoor soil,” and applied it to USEPA outdoor soil level of 400 ppm, the action level for lead concentrations in residential soil, and developed a standard of 316 ppm.²²

This approach lacks merit for a number of reasons. First, in contrast to ATSDR’s and USEPA’s sole reliance on lead dust concentrations here, the scientific community believes that lead loading information must be assessed instead of or in addition to concentration information in order to understand human lead exposure correctly.²³ Concentration measures mass concentration while loading represents the area concentration in a given square footage. While the IEUBK model “only accepts inputs on dust lead in units of lead concentration,” *both* lead concentration and lead loading are important in understanding the likely exposures from indoor lead dust; indeed, HUD uses dust lead loading both for “determining the level of health hazard” and “effectiveness of abatement activities.”²⁴ Scientists also have indicated that measuring lead loading “in a child’s environment expressed more realistically the exposure of the child to lead than did lead concentration measurements.”²⁵ Relying on concentration alone for pre-cleaning sampling disregards ATSDR’s recommendation at the USS Lead Site that sampling teams measure the surface area when vacuuming for samples in order to calculate *loading* in mass per square foot.²⁶ Measuring risk assessment in concentration alone prevents a comparison between USEPA’s standards for the USS Lead Site to USEPA’s own existing indoor-dust standards and standards set by HUD, which are both measured in loading. Yet, if USEPA has used both loading and concentration in both its pre- and post-cleaning sampling, it has not shared that with the residents.

²⁰ Decl. of Mark Johnson, *Atlantic Richfield*, No. 2:14-cv-00312, *supra* note 16, at 13-14.

²¹ *Id.* at 14.

²² USEPA Region 5, *Development of an Indoor Dust Screening Criteria for the USS Lead Site*, Mem., 1 (August 10, 2016), <https://semspub.epa.gov/work/05/929996.pdf> (herein after “Dust Screening Memo”).

²³ Lanphear, *et al.*, “A Side-by-Side Comparison of Dust Collection Methods for Sampling Lead-Contaminated House Dust,” 68 ENVTL. RESEARCH, 114-123 (Feb. 1995), <https://www.ncbi.nlm.nih.gov/pubmed/7601072>.

²⁴ Dust Screening Memo, *supra* note 22, at 5.

²⁵ See Lanphear *et al.*, *supra* note 23, at 114.

²⁶ Decl. of Mark Johnson, *Atlantic Richfield*, No. 2:14-cv-00312, *supra* note 16, at 15.

Second, neither the lead dust concentration number nor the lead dust loading number are set at a protective level. The 400 ppm exterior soil standard and the resulting indoor screening level of 316 ppm are calculated based on an outdated blood lead level of 10 micrograms per deciliter of blood ($\mu\text{g}/\text{dL}$).²⁷ EPA is alone in maintaining that a blood lead level of 10 $\mu\text{g}/\text{dL}$ is acceptable; both the Centers for Disease Control and Prevention (CDC) and the U.S. Department of Housing and Urban Development (HUD) use 5 $\mu\text{g}/\text{dL}$ as a reference level.²⁸ The post-cleaning, dust loading standard of 25 micrograms per square foot ($\mu\text{g}/\text{ft}^2$) is also inadequate; as mentioned above, ATSDR has recommended 20 $\mu\text{g}/\text{ft}^2$ at other sites. HUD's current dust-lead standard is set at a significantly more protective 10 $\mu\text{g}/\text{ft}^2$ for floors. And, the Ninth Circuit's *In re Community Voice* ruling also ordered USEPA to update its lead hazard standard generally.

USEPA has an opportunity to update its interior lead dust standard to ensure that residents at the Site are protected.

2. Selection of arsenic standards

Here, USEPA chose a standard for indoor arsenic with virtually no analysis: "the indoor dust screening level for arsenic was recommended to be the same as the outdoor soil action level of 26 ppm."²⁹ USEPA relied on the fact that it does not address arsenic levels that are below a "naturally occurring background" level and determined the "site specific background concentration for arsenic in soils at the USS Lead Site" was 26 parts per million (ppm);³⁰ it concluded that homes with concentrations of arsenic below 26 ppm are "below background concentrations and safe for unrestricted residential use."³¹

As an initial matter, we disagree with USEPA's selection of 26 ppm at this site considering that it found background levels of arsenic were 14.1 ppm.³² Other Superfund sites

²⁷ *Id.*

²⁸ HUD, *HUD Issues Final Rule to Help Children Exposed to Lead Paint Hazards*, Press Release (Jan. 13, 2017) https://www.hud.gov/press/press_releases_media_advisories/2017/HUDNo_17-006.

²⁹ Decl. of Mark Johnson, *Atlantic Richfield*, No. 2:14-cv-00312, *supra* note 16, at 15.

³⁰ USEPA Region 5, "Justification for Using Site-Specific Arsenic Background Concentration in Soil for Indoor Dust Screening Concentration for the USS Lead Site," Mem., 2 (Dec. 13, 2016), <https://semspub.epa.gov/work/05/931125.pdf>.

³¹ *Id.*

³² See EPA Region 5, Response to the National Remedy Review Board's Comments re Remedy Selection, 5-7 (June 25, 2012), attached (Note 32 attachment)

that sit in Region 5.³³ It is not self-evident, as USEPA presents, that 26 ppm is protective and therefore justified here because that level is “well below” the emergency removal action level for arsenic of 68 ppm. Because USEPA is assuming that “100 percent of house dust comes from exterior soils,” it considers 26 ppm the background for exterior soils *and* residential house dust.³⁴ However, even if USEPA’s assumption about the origin of residential house dust is taken as true, it is not clear on its face that the bioavailability of arsenic is the same in exterior soil versus indoor dust.

As a reflection of the ad hoc nature of this standard setting, just a few months earlier, USEPA used the same rates of ingestion to claim that a clearance level of 100 mg/kg was protective.³⁵ USEPA should revisit the arsenic standard again and make it more protective.

B. USEPA’s resident sampling reports are meaningless because they compare apples to oranges

USEPA has provided residents with reports that indicate a pre-cleaning lead and arsenic dust *concentration value* and a post-cleaning dust *loading value*. By providing the information in two different forms of measurement, USEPA has prevented residents from making any comparison between pre- and post-cleaning results at the USS Lead Site.³⁶

USEPA has taken this unexplainable approach despite ATSDR’s recommendation that USEPA compare the value of loading pre-cleaning to loading post-cleaning to “verify the effectiveness of the cleaning process.”³⁷ For post-cleaning and re-cleaning, USEPA is using the loading standards of 25 µg/ft² for lead and 36 µg/ft² for arsenic.³⁸ However, by measuring risk

³³ See, e.g., USEPA Matthiessen and Hegeler Zinc Company Superfund Site Record of Decision (2017) (using 18 ppm as the action level for arsenic), <https://semspub.epa.gov/work/05/508966.pdf>; IEPA: New Jersey Zinc/Mobil Chemical Corp Superfund Site, DePue, IL Record of Decision, 26 (2018) (using 21 ppm as the action level for arsenic), <http://www.epa.illinois.gov/Assets/iepa/community-relations/new-jersey-zinc/record-of-decision.pdf>

³⁴ *Id.*

³⁵ Memorandum, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *Development of an Indoor Dust Arsenic Screening Criteria for the USS Lead Site*, 1 (Sept. 20, 2016), <https://semspub.epa.gov/work/05/929997.pdf>

³⁶ See e.g., Multnomah County: Prevalence of Lead Dust Hazards Study, ftne 2 (2001) (“The outdoor soil lead is measured differently than dust lead from inside the home. In soil, it is the weight of the lead in a known weight of soil (called the lead concentration). In indoor dust, it is the weight of the lead in a known surface area that has been wiped (the lead loading). Lead concentrations and lead loadings cannot be directly compared with each other.”)

³⁷ *Id.*

³⁸ Unilateral Administrative Order for Interior Removal Actions in Zone 2 and Zone 3 of Operable Unit 1 of the U.S. Smelter and Lead Refinery, Inc. Superfund Site. 6 (01 12 2018).

assessment level in concentration and re-cleaning in loading, neither USEPA nor residents can make a meaningful comparison to conclude whether a home has been effectively cleaned.

While USEPA justifies disregarding ATSDR's recommendations by claiming that providing a loading value on the front end—or a concentration value on the back end—would be misleading, on the contrary, matching the value of pre-cleaning to post-cleaning is the only meaningful estimate of a dust lead hazard. The only way to determine if a clean-up was effective, or whether re-cleaning is necessary, is if USEPA collects dust lead loading at the baseline and at clearance.

IV. EPA made assumptions about resident's preferences by deliberately choosing to hire contractors who are not certified in Indiana

USEPA chose to employ contractors who were not certified in Indiana but never communicated that fact to the residents or the CAG and never sought input on that choice. This is a significant issue in light of the fact that as many as half of the homes have lead-based paint. USEPA explains that this was a conscious choice, in order to avoid the problem of formally identifying lead-based paint, which would create additional reporting requirements for residents and potentially restrict USEPA's access to properties. However, this argument does not hold up. Not only does USEPA already inform residents that their home *probably* contains lead-based paint, the community of East Chicago's has already been *publicly* labeled as a site contaminated with lead. While abatement costs and reporting requirements may be prohibitive for individual residents, the community should have been involved with the decision of how to proceed with this process, instead of making assumptions. Moreover, USEPA, the PRPs, Indiana Department of Environmental Management, the Indiana State Department of Health and the City of East Chicago should identify additional resources for lead-based paint abatement at the Site.

V. Conclusion

The Superfund Lead Residential Sites Handbook expressly states that “[l]ead-contaminated interior residential dust presents a significant exposure pathway that can readily be addressed.”³⁹ The CAG requests that USEPA improve the interior dust assessment and cleanup to protect human health in this environmental justice community that has already

³⁹ Handbook, *supra* note 6, at 51.

suffered a disproportionate amount of harm associated with lead and arsenic exposure over decades. Please commit to take the following actions that will better protect this community:

- Perform interior dust sampling at all remaining homes in the Site regardless of whether they will require exterior soil cleanup.
- Follow a more protective standard for lead—HUD’s 10 ug/ft² dust loading standard—and lower the arsenic standard to afford more protection to the residents.
- Provide residents with more meaningful dust sampling reports that include the same form of measurement, ideally dust loading, for pre- and post-cleaning.
- Consult the residents regarding the most appropriate type of contractor, and lead-safe training, and consider additional ways to fund lead-based paint abatement at the Site.

We would welcome the opportunity to discuss any of these requests in more detail.

Sincerely,



Electronically signed: Maritza Lopez, Akeeshea Daniels, Lori Locklear

East Chicago / Calumet Coalition Community Advisory Group [ECCC CAG]

CAG's Zone 1 Comments

January 14, 2019

By email to pope.janet@epa.gov

Janet Pope
Community Involvement Coordinator
United States Environmental Protection Agency
77 West Jackson Boulevard, SI-6J
Chicago, IL 60604

Re: Comment on USS Lead Superfund Site (EPA ID IND 005 174 354)
Proposed Record of Decision Amendment

Dear Ms. Pope,

The East Chicago Calumet Coalition Community Advisory Group (“CAG”), Northwestern Pritzker Law Environmental Advocacy Clinic, and the Abrams Environmental Law Clinic at the University of Chicago Law School submit these comments regarding the United States Environmental Protection Agency’s (“USEPA”) November 2018 Proposed Record of Decision Amendment (“PRODA”) for the USS Lead Superfund Site in East Chicago, Indiana.

USEPA’s PRODA offers an opportunity to right an environmental injustice by removing all the known lead and arsenic contamination from the soil of Zone 1 of Operable Unit 1 of the USS Lead Site. USEPA should revise this PRODA for Zone 1 in a way that protects the public health of this overly burdened community¹ and reflects the most up-to-date health and environmental assessment data available. Only Alternative 4D, excavation of contaminated soil to native sands, removes all the contaminated soil. USEPA should select Alternative 4D, but it also should expedite the groundwater

¹ The USS Lead Site is an environmental justice community. USEPA, *U.S. Smelter and Lead Refinery Inc. Superfund Site, OUI Record of Decision* (“2012 ROD”), 15 (2012), available at <https://semspub.epa.gov/work/05/446987.pdf>.

remediation at the site (which is part of the Operable Unit 2 remedy); inclusion of the groundwater cleanup at this time would avoid both leaching of contamination into the groundwater and contamination spreading from the groundwater to the clean soil. When the remediation is complete, Zone 1 should be cleaned to the most protective level possible so that residents feel safe in their community. In light of the devastating and permanent health impacts of the contamination caused by the responsible parties, the decades of delay by government, and community preference, the most protective cleanup is the only acceptable approach for Zone 1 of the USS Lead Site.

These comments will explain that, based on its own analysis, USEPA should have selected Alternative 4D over Alternative 4B for at least three reasons. First, Alternative 4B does not protect public health or the environment. Alternative B leaves a tremendous amount of contamination in the ground and restricts activities below 24,” which makes future home building virtually impossible. Alternative 4B also does not address the contamination of groundwater. Second, the required balancing criteria favor Alternative 4D because it comes closest to providing a permanent cleanup. Third, Alternative 4D is the only plan with widespread community acceptance.

USEPA’s PRODA also relies on a flawed understanding of the site, and inadequate community participation in the decision-making of the future use of the site. These comments will draw attention to several substantial gaps in the PRODA. Despite the known errors of the original 2012 Remedial Investigation, 2012 Human Health Risk and 2011 Agency for Toxics Substances Report at the USS Lead Site, USEPA did not consider more up-to-date, site-specific information such as the 2017 Amereco Phase II Environmental Site Assessment and the 2018 Agency for Toxic Substances and Disease Registry report. In addition, the public process for the PRODA has failed to afford all

residents an opportunity to present oral comments. Moreover, the PRODA's unusual contingency plan allows USEPA to circumvent further public input by allowing USEPA to switch plans after the comment deadline.

I. Background

A. History of Contamination at the West Calumet Housing Project.

For generations, thousands of residents lived on the USS Lead Site, unaware that extremely high levels of lead and arsenic posed grave risks to their health. Historically, several lead smelters and a lead arsenate pesticide facility operated in the area surrounding the residential community known as Operable Unit 1 of the USS Lead Site. Government officials knew about the contamination even before 1972, when the East Chicago Housing Authority intentionally built public housing on top of the former Anaconda lead smelter.² At many points over the last 40 years, government officials failed to take action when faced with new information about the contamination—at great cost to the well-being of the impacted community.

Before the summer of 2016, the West Calumet Housing Complex (“WCHC”) housed more than 1,000 people, including almost 700 children.³ Goodman Park offered the community a playground, a pool, a sledding hill. Many children walked the short distance to the Carrie Gosch Elementary School, also in Zone 1. What residents did not know was that they were being exposed to extremely high levels of arsenic, lead, and other contaminants.

² The director of the agency would later be indicted for taking bribes from developers. *See, Lead Crisis in Housing Project was Actually No Surprise*, ASSOCIATED PRESS (Sep. 23, 2016), available at <https://apnews.com/0d508d2021bb45319a41708973ef7650>.

³ *Id.*

The public health crisis of the WCHC and the USS Lead Site became a national news story when, in July 2016, East Chicago Mayor Anthony Copeland ordered the relocation of WCHC residents and announced a plan to demolish the WCHC. He based his decision on newly revealed data collected by USEPA. Some soil samples at the WCHC showed lead as high as 91,000 parts per million (“ppm”)—more than 200 times the action level of 400 ppm. An indoor sample revealed 32,000 ppm of lead. Considering that no amount of lead is safe, the level of contamination at this site is unconscionable. Arsenic levels also dramatically exceeded the 26 ppm action level and were as high as 3,530 ppm, or more than 130 times above the standard.⁴

The contaminants at this site cause acute and chronic physical and mental health problems. Lead poisoning causes irreversible neurological harm and results in numerous and severe morbidities, such as significant biological and neurological damage affecting cognition, behavior, bodily functions, growth, and development.⁵ It is unsurprising that the Agency for Toxic Substances and Disease Registry’s (“ATSDR”) 2018 report about the USS Lead Site demonstrated that children in Zones 1 and 2 were up to three times more likely to have elevated blood lead levels than children in other parts of industrialized East Chicago.⁶ Arsenic, which is also present at the site, is a known carcinogen that can cause liver, bladder, and lung cancer.⁷

⁴ USEPA, *Results of Lead and Arsenic Testing in the West Calumet Housing Complex* (2016), available at <https://www.epa.gov/uss-lead-superfund-site/west-calumet-housing-complex-east-chicago-ind>.

⁵ Elise Gould, *Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control*, 117 ENV. HEALTH PERSP. 1162, 1162 (2009).

⁶ ATSDR, *Health Consultation*, 3 (Aug. 8, 2018), available at https://www.atsdr.cdc.gov/HAC/pha/USSmelterandLeadRefinery/US_Smelter_Lead_Refinery_HC_2018-508.pdf

⁷ USEPA, *Action Memorandum-Fifth Amendment: Request for a Change in Scope and Ceiling Increase for the Time-Critical Removal Action at the U.S. Smelter and Lead Refinery Site, East*

In September 2016, the Mayor announced the WCHC would be demolished, and USEPA put on hold its remediation of Zone 1. Without the hardscapes and buildings on the site, a new remediation plan would be necessary. By June 2017, the last few residents of Zone 1 had been forced to leave, and in 2018 the WCHC was demolished. The Carrie Gosch School building on the site had already been closed, and its students relocated to another school building off-site.

Testing of the soil under the former WCHC, required as part of the environmental assessment required before the WCHC demolition, revealed even more startling news about the depth and severity of the contamination. Lead and arsenic are present in massive concentrations “throughout the site,” in both the deep soil and groundwater.⁸ Samples taken four feet below ground level show lead at levels as high as 23,000 ppm and arsenic levels as high as 5,200 ppm, well above the 400 ppm and 26 ppm action levels, respectively.⁹ Arsenic exceeded the groundwater screening levels in 13 samples, in some cases by as much as 50 times the standard. Lead in the groundwater exceeded the screening levels in 16 wells, in some cases by as much as 100 times. While the contractors did not test below six feet, they reported that parts of the former Anaconda plant are buried as deep as 11 feet below ground.¹⁰ The environmental assessment report concluded: “Additional investigation is recommended to identify the source area and delineate the contamination vertically and horizontally.”¹¹

Chicago, Lake County, Indiana (Site ID # 053J), at 10 (March 2017), available at <https://semspub.epa.gov/work/05/933033.pdf>

⁸ Amereco, *Phase II Environmental Site Assessment* (Feb. 17, 2017), available at <https://semspub.epa.gov/work/05/941443.pdf>

⁹ *Id.* at 11.

¹⁰ *Id.* at Appendix B.

¹¹ *Id.* at 15.

B. USEPA's Proposed Amended Remedy for Zone 1

In response to the changed site conditions, USEPA was forced to adopt a new plan to remediate Zone 1. This new plan is the subject of the PRODA, which lays out the alternatives for the new course of action. This comment focuses on the remedial alternatives that include excavation, especially Alternative 4B and Alternative 4D.¹² These alternatives recognize the need to remove the contamination from the residential area of the USS Lead Site. Alternative 4B, which is USEPA's preferred remedy, removes the top 24" of soil.¹³ Alternative 4D removes all soil, fill, and slag down to the native sand.¹⁴ Each alternative replaces the excavated soil with clean fill, and USEPA has stated that either remedy would allow the site of the former WCHC to be used for residential purposes after remediation.¹⁵

While USEPA prefers Alternative 4B, the PRODA also includes a contingency to switch from Alternative 4B to Alternative 4A if "a sufficient level of certainty exists that an actual change in future land use to industrial/commercial is more probable than not to occur."¹⁶ While the preferred Alternative 4B would remove 24" of soil and designate the area residential, Alternative 4A is the remedy for future industrial or commercial use; it removes the WCHC and the Goodman Park soil to a depth of 12." Notably, the PRODA

¹² We agree that certain remedial alternatives were appropriately discarded without further consideration: Alternative 2 – Institutional Controls; Alternatives 3A and 3B – that leave the pollution in place and cover the site with either soil or asphalt.

¹³ U.S. Environmental Protection Agency Region 5, *Proposed Record of Decision Amendment, U.S. Smelter and Lead Refinery, Inc. Superfund Site East Chicago, Lake County, Indiana* ("PRODA") 2-3 (Nov. 2018), available at <https://semspub.epa.gov/work/05/943693.pdf>.

¹⁴ *Id.* at 3.

¹⁵ *Id.* at 2–3.

¹⁶ *Id.* at 4.

relegates Carrie Gosch School, also located in Zone 1, to a footnote where it indicates that Carrie Gosch will be cleaned in a manner consistent with the 2012 ROD.¹⁷

II. USEPA Should Learn from the Past and Select the Most Protective Remedy.

Even though generations of families have been permanently harmed by the past and ongoing exposure to lead and arsenic at the USS Lead Site, USEPA still has not selected the most protective cleanup plan. The preferred Alternative 4B would leave a tremendous amount of contaminated material—100,000 cubic yards—in the ground. We rejects this proposal. Instead, USEPA should adopt the “most protective remedy”—Alternative 4D, excavation down to native sand.¹⁸

Applying the nine criteria for analyzing remedial alternatives at CERCLA sites that are set forth in Section 121 of CERCLA¹⁹ and applicable regulations,²⁰ USEPA should reject Alternative 4B and select Alternative 4D. USEPA has interpreted these regulations as dividing the nine criteria into threshold criteria, balancing criteria, and modifying criteria.²¹ First, USEPA’s preferred remedy does not meet the threshold criteria of adequately protecting human health and the environment. Second, the balancing criteria are best met here by the most protective remedy—Alternative 4D. Third, USEPA’s preferred remedy, Alternative 4B, lacks community acceptance.

¹⁷ *Id.* at note 8.

¹⁸ USEPA itself calls this the most protective remedy. *PRODA*, *supra* note 13, at 17.

¹⁹ 42 U.S.C. § 9621 (2018).

²⁰ 40 C.F.R. § 300.430(e)(9)(iii) (2018).

²¹ *PRODA*, *supra* note 13, at 17.

A. The Preferred Remedy Does Not Meet the Threshold Criteria of Protecting Human Health and the Environment and Complying with Applicable or Relevant and Appropriate Requirements.

A selected remedial alternative must meet the threshold criteria of “adequately protect[ing] human health and the environment”²² and “complying with applicable or relevant and appropriate requirements.”²³

1. Alternative B does not adequately protect human health or the environment.

The cleanup under Alternative 4B is not sufficient to address health and environmental concerns that will arise should homes be built in Zone 1. Critically, Alternative 4B also does not address the health and environmental concerns associated with groundwater.

a. Remedial Alternative 4B Would Not Make Zone 1 Safe for Houses.

USEPA has selected Alternative 4B as the preferred remedy based on the flawed assumption that contamination below 24” causes no danger to human health. This assertion is based on “agency experience.”²⁴ USEPA provides no scientific evidence in support of this statement. Zone 1 is meaningfully different than most cleanup sites because no existing housing is in place; the building of new housing stock on the site is highly likely to disturb soil below 24.”

The 24” rule is almost certainly derived from the cleanup of Superfund sites with *existing housing*. Indeed, the original 2012 remedy for Zone 1, when the WCHC still stood, required a 24” excavation on impacted soil.²⁵ When USEPA considers the benefits of 24” excavation, it imagines a world in which development is complete and residents

²² 40 C.F.R. § 300.430(e)(9)(iii)(A) (2018).

²³ 40 C.F.R. § 300.430(e)(9)(iii)(B) (2018).

²⁴ *PRODA*, *supra* note 13, at 2.

²⁵ *2012 ROD*, *supra* note 1, at 4-5.

rarely dig below two feet.²⁶ Here, however, Zone 1 is awaiting redevelopment. Any residential building in Zone 1 will require significant excavation below 24,” particularly if the houses will be built with basements, which is common in this community.²⁷ Future contractors would need to excavate a significant amount of additional earth for this kind of construction, which raises concerns over whether building contractors will have the financial capacity and expertise needed to handle properly the contaminated material and protect nearby residents and workers.²⁸

Utilities pose an additional problem, which is relevant no matter what type of construction occurs at the site. The houses will need to be hooked up to gas, water, and electric. Many of these utilities are buried deeper than 24.” Indeed, some of the existing infrastructure is dated and will require replacement or adaptation to the new construction. The water service lines are almost certainly made of lead. If Alternative 4B is selected, residential construction in Zone 1 will be dangerous, expensive, and ultimately unlikely. The responsible parties should bear the costs of properly cleaning up the soil to native sands—not the housing developers, small contractors, future homeowners, utilities or the City of East Chicago.

Even if some of these issues are addressed, future residents may not have the knowledge of the contamination or the wherewithal to modify their activities to avoid the

²⁶ USEPA states that “gardening is the only activity that goes below 12.” *PRODA*, *supra* note 13, at 2.

²⁷ The Indiana Residential Code, 675 Indiana Administrative Code 14-4.3, requires all one or two family dwellings in Lake County to place footings at least 36” below ground for protection from frost heave. This virtually guarantees any new construction in Zone 1 will impact the contaminated soil left in the ground.

²⁸ Even if the future contractors could remove the sub-24” soil in a safe manner for this kind of construction, the remaining soil surrounding the basements would remain contaminated by lead and arsenic. It is precisely this problem that afflicts the residents of Zones 2 and 3, where basement flooding transports contaminants from subsurface soil into their homes and sumps.

contamination. Over time, there will be less and less awareness of the institutional controls at the site.²⁹ Certain individuals may want to build an addition to their home or a large shed that requires footings. They may not be aware of or capable of addressing the contamination, thereby exposing themselves and others to toxics when they proceed with construction.

In addition to the challenges of construction at this site, there are other significant risks of future exposure to the sub-24" contamination. Zone 1 sits in a dynamic ecosystem prone to flooding and erosion.³⁰ Unusual weather events such as major storms are expected to increase in the coming years.³¹ The impact of more extreme weather on the fragile ecosystem under Zone 1 threatens to overwhelm the 24" barrier, exposing contaminated soil and mobilizing contaminants.³² The PRODA does not consider potential flooding or threats associated with climate change.

²⁹ This "atrophy of vigilance" is common at Superfund sites. The case of Midvale, Utah is instructive. There, USEPA remediated a mixed residential/industrial site with a mix of excavation and institutional controls. These institutional controls required permits and testing prior to any digging. EPA even reimbursed the municipality for compliance costs. Yet no one ever followed this process. Within a few years, city workers would inadvertently find private and state excavations of contaminated soil, including a state road project. Env'tl. Law Inst., *Protecting Public Health At Superfund Sites: Can Institutional Controls Meet The Challenge?*, 37, 45-48, 58. (1999), available at <https://www.eli.org/sites/default/files/eli-pubs/d10.01.pdf>. See also, Sara Fox, *CERCLA, Institutional Control, and the Legacy of Urban Land Use*, 42 Env'tl. L. 1211 (2012).

³⁰ The Indiana Harbor Shipping Canal is located immediately adjacent on the western boundary of Zone 1. The entire area is considered within the fluvial erosion area of the canal. Indiana Department of Natural Resources, Fluvial Erosion Hazards in Indiana, <https://indnr.maps.arcgis.com/apps/webappviewer/index.html?id=43e7b307a0184c7c851b5068941e2e23>. Further, at least a portion of Zone 1 sits in a flood zone. See Indiana Department of Natural Resources Indiana Floodplain Mapping (searchable by address), <https://indnr.maps.arcgis.com/apps/MapSeries/index.html?appid=48665e0948b04b398fbc07b8ea1cf232>.

³¹ Chelsea Harvey, "Extreme Weather Will Occur More Frequently Worldwide E&E News (February 15, 2018), available at <https://www.scientificamerican.com/article/extreme-weather-will-occur-more-frequently-worldwide/>

³² EPA, "Superfund Climate Change Adaptation," (last visited on 1/14/19), <https://www.epa.gov/superfund/superfund-climate-change-adaptation>

In short, Alternative 4B is wholly insufficient to restore Zone 1 for actual homebuilding and does not adequately protect human health and the environment.

b. Remedial Alternative 4B Does Not Address the Health and Environmental Concerns Associated with Groundwater.

USEPA has stated repeatedly that it will consider the groundwater under Zone 1 as part of the ongoing Operable Unit 2 remedy,³³ but USEPA must also consider groundwater in the PRODA because it is part of the environment, as defined by CERCLA.³⁴ Under Alternative 4B, USEPA would leave behind contaminated soil that would leach arsenic and lead into the groundwater. In turn, the contaminated groundwater, which sometimes flows near the surface, also may contaminate the clean fill.

Because the groundwater investigation is in its earliest phase,³⁵ USEPA does not yet fully understand the nature and movement of the site's groundwater contamination. At the public meeting, USEPA characterized the present groundwater contamination below Zone 1 as "limited,"³⁶ but the available reports show otherwise. The Phase II Site Assessment reveals that arsenic levels exceed safe limits in 14 of 34 groundwater samples in Zone 1.³⁷ Seventeen wells contained lead in excess of Indiana Department Environmental Management ("IDEM") standards.³⁸

³³ 2012 ROD, *supra* note 1, 9; see also USEPA, *Operable Unit 2 – Update Oct. 2018*, <https://www.epa.gov/uss-lead-superfund-site/operable-unit-2-uss-lead-superfund-site>

³⁴ CERCLA regulations define "environment" as "the navigable waters [...] and any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States or under the jurisdiction of the United States." 40 C.F.R. § 300.5 (2018).

³⁵ USEPA, *EPA Oversees Installation of Groundwater Monitoring Wells at the USS Lead Superfund site, East Chicago, Ind.*, available at <https://www.epa.gov/newsreleases/epa-oversees-installation-groundwater-monitoring-wells-uss-lead-superfund-site-east>

³⁶ The transcript of this meeting remains unavailable because of the federal shutdown.

³⁷ *Phase II Site Assessment*, *supra* note 8, at 12.

³⁸ *Id.*

Groundwater contamination may negatively impact the health of community members throughout the USS Lead Site. Although East Chicago pulls its drinking water from Lake Michigan, the groundwater contamination may reach residents in other ways, particularly considering the shallow depth of the region's groundwater.³⁹ For example, floodwaters containing contaminated groundwater may re-contaminate Zone 1 soil or enter residents' basements, further contaminating their homes and possessions.⁴⁰ Without a thorough study of the risks posed by groundwater contamination, USEPA cannot predict the ultimate health consequences of ignoring groundwater in the PRODA. Without more certainty, the PRODA has failed to meet the threshold standard of protecting human health.

By refusing to address the groundwater concerns, Alternative 4B does not protect the environment. In addition, Zone 1 is hydraulically connected to the Indiana Harbor Shipping Canal, the Grand Calumet River, and the Lake Michigan watershed.⁴¹

³⁹ The water table in East Chicago runs from 0 to approximately 5 feet deep. The water table level is primarily set by the level of Lake Michigan, which is presently high. *U.S. Geological Survey Water-Resources Investigations Report 92-4115*, 2 (1993); <https://pubs.usgs.gov/wri/1992/4115/report.pdf>; Northwest Indiana Times, "Lake Michigan water levels at the highest point in 20 years causing headaches for some who call the beach home," (June 11, 2018), https://www.nwitimes.com/news/local/lake/lake-michigan-water-levels-at-highest-point-in-years-causing/article_241032cc-4135-5f39-b8b3-2d8c8fce4224.html. Also, residents in the Zone 2 and Zone 3 regularly report groundwater seepage in their basements. USEPA should have considered this issue more rigorously before deciding to leave the contamination in the ground.

⁴⁰ At the public meeting, USEPA said that if the sub-24" contamination proves to be a source for groundwater problems, USEPA will initiate a pump and treat option. Yet in the RCRA remediation at the neighboring DuPont site, USEPA rejected pump-and-treat because it does not meet "green remediation practices." USEPA, *DuPont Statement of Basis*, 20 (2017), available at https://www.epa.gov/sites/production/files/2017-11/documents/final_dupont_east_chicago_western_portion_statement_of_basis_-_11-2-17_2.pdf. As is discussed below under II.B., the most effective treatment option is to remove the contamination now.

⁴¹ Joseph M. Fenelon And Lee R. Watson, *Geohydrology and Water Quality of the Calumet Aquifer, in the Vicinity of the Grand Calumet River/Indiana Harbor Canal, Northwestern Indiana* *U.S. Geological Survey Water-Resources Investigations Report 92-4115*, 2 (1993) (noting that the study would support efforts to understand whether contaminated groundwater was degrading Lake Michigan water quality), available at

Groundwater from the site may contribute to the contamination of these various bodies of water. It is in the best interests of the community and the environment for USEPA to address groundwater contamination during the course of this remediation.

In addition to omitting groundwater and waterways, the PRODA also leaves out any consideration of wildlife found at the USS Lead site. When USEPA prepared the 2012 ROD, it summarily concluded that no ecological risk assessment was needed.⁴² USEPA has not considered whether the documented presence of a bald eagle nest in nearby Operable Unit 2 of the USS Lead Site alters that conclusion.

Thus, USEPA should revisit its analysis of the public health and the environment criterion for each alternative.

2. Alternative B Does Not Comply with Applicable Indiana Law

USEPA must assess a second threshold criterion—whether each alternative complies with “applicable or relevant and appropriate requirements” (“ARARs”).⁴³ But that has not happened here. USEPA merely included a table of ARARs; it did not evaluate them.

In particular, USEPA did not evaluate Alternative B’s compliance with Indiana code that relates to leaching of contaminants from soil to groundwater. The Indiana Remediation Closure Guide provides

[r]esidential migration to ground water screening levels apply to chemicals present in vadose zone soils. Exceedance of residential migration to ground water screening levels suggests the potential for chemicals in the soil to leach to ground water at concentrations that exceed residential ground water direct contact screening levels.⁴⁴

<https://pubs.usgs.gov/wri/1992/4115/report.pdf>.

⁴²2012 ROD, *supra* note 1, at 15 (2012).

⁴³ 40 C.F.R. § 300.430(e)(9)(iii)(B) (2018).

⁴⁴ Indiana Department of Environmental Management (“IDEM”), *Indiana Remediation Closure Guide*, 163, Appendix A, available at https://www.in.gov/idem/cleanups/files/remediation_closure_guide.pdf. Although the Guide

The Feasibility Study (“FS”) lists the Indiana Voluntary Remediation act as an ARAR.⁴⁵

It also acknowledges that the Phase II Site Assessment found samples that greatly exceeded the Indiana Closure screening levels. Nonetheless, neither the FS nor the PRODA analyze the threat to groundwater at all and do not demonstrate that Alternative 4B meets this ARAR.

USEPA should undertake a proper analysis of all ARARs before finalizing its remediation plan here.

B. The Two Most Important Balancing Criteria—Permanence and Reduction of Toxicity—Support Alternative 4D.

Although Alternative 4B does not meet the threshold criteria for the reasons stated above, for plans that do meet the threshold criteria, USEPA must weigh the five balancing criteria: long-term effectiveness, reduction of toxicity and mobility through treatment, short-term effectiveness, implementability, and cost.⁴⁶ These criteria are not equal: “Long-term effectiveness and permanence” and “reduction through treatment” are the two most important.⁴⁷ Indeed, “permanence is a major theme of CERCLA Section 121” and “is often decisive where the alternatives vary significantly” in the amount of toxic materials left onsite.⁴⁸ In addition, “those criteria that distinguish the alternatives the most will be the most decisive factors in the balancing.”⁴⁹ Alternative 4D is the only

states that site-specific levels may be set higher than screening levels, it requires a risk characterization in those cases. *Id.* at 16.

⁴⁵ USEPA, *Feasibility Study Report for USS Lead OUI Zone 1 Site East Chicago, Indiana* (2018) at Table 4-2.

⁴⁶ PRODA, *supra* note 13, at 17.

⁴⁷ 40 C.F.R. § 300.430 (2018). (“The balancing shall emphasize long-term effectiveness and reduction of toxicity, mobility, or volume through treatment”). *See also* USEPA, OSWER 9355.0-27FS, *A Guide to Selecting Superfund Remedial Actions* (“Guide”), 3–4, <https://www.epa.gov/superfund/key-principles-superfund-remedy-selection>

⁴⁸ *Guide*, *supra* note 47, at 4.

⁴⁹ *Id.* at 5.

remedy that is permanent and effective over the long term, and it results in the greatest reduction of toxicity. The only criteria that cut against Alternative 4D are less important under CERCLA. There is little difference among the remedies along the dimensions of implementability and cost. It appears USEPA has chosen Alternative 4B principally based on the balancing factor of cost, which is contrary to regulation and guidance.

1. EPA Should Select Alternative 4D Because It Is the Remedy that is Permanent and Effective Over the Long-Term and that Reduces Toxicity to the Maximum Extent Practicable.

“Long-term effectiveness and permanence” is one of the “two most important” balancing factors,⁵⁰ and USEPA notes that Alternative 4D “provides the greatest degree” of long-term effectiveness, requiring no operation and maintenance or institutional controls.⁵¹ It is not a matter of degree, it is a matter of kind; Alternative 4D is permanent and effective over the long-term, while the other alternatives are not. Alternative 4D does not depend on good luck or the future goodwill of anyone. It neither depends on USEPA’s attention nor residents or developers adhering to the underground warning barriers or deed restrictions for decades in the future. Unlike any other plan, Alternative 4D completely removes the contamination from the soil.

The other most important balancing factor is “reduction through treatment,”⁵² and Alternative 4D achieves the greatest reduction of toxicity and mobility of contaminants.⁵³ USEPA estimates Alternative 4D will remove and treat more than 1.5 times the volume of contaminated soil as Alternative 4B.⁵⁴ The amount of toxic metals removed may be

⁵⁰ *Id.* at 3-4.

⁵¹ *PRODA*, *supra* note 13, at 19.

⁵² *Guide*, *supra* note 47, 3-4.

⁵³ *PRODA*, *supra* note 13, at 19.

⁵⁴ *Id.* at 14-15.

even higher than USEPA's estimate because the soils below 24" are more contaminated than those above 24." USEPA tested down to 30" in Zone 1 and found the highest arsenic concentrations between 24" and 30."⁵⁵ The Phase II Site Assessment tested down to six feet and found even very high levels of lead and arsenic below 30." USEPA also recognizes the existence of plant debris down to eight feet. Alternative 4D also does more to protect the groundwater than all the other remedies by removing the contaminated soil as a source of pollution.⁵⁶ If USEPA selects an alternative other than Alternative 4D, contamination will continue to leach into the groundwater, a principal concern in mobility reduction.⁵⁷

2. Implementability and Short-Term Effectiveness Are Not Determinative.

Because the criteria of implementability and short-term effectiveness do not distinguish significantly between Alternative 4D and Alternative 4B, USEPA should accord those criteria little weight when it considers them as balancing factors.⁵⁸ As USEPA notes, both Alternative 4B and Alternative 4D are "readily implementable" and have been "used successfully at other environmental cleanup projects."⁵⁹ Alternative 4D takes five months longer, which makes it marginally less safe in the short term for workers and residents.⁶⁰ Likewise, Alternative 4D is slightly more difficult to implement "due to the challenges associated with excavating below the groundwater table,"⁶¹ requiring "[s]ide slope stability, dewatering of the excavation, and possibly treatment of

⁵⁵ *Id.* at 11-12, Table 1.

⁵⁶ See *supra* section I.A.1.b. As discussed above, though, USEPA should coordinate the Zone 1 remedy with the ongoing groundwater investigation.

⁵⁷ *PRODA*, *supra* note 13, at 19.

⁵⁸ *Guide*, *supra* note 47, 5 ("[T]hose criteria that distinguish the alternatives the most will be the most decisive factors in the balancing").

⁵⁹ *PRODA*, *supra* note 13, at 21.

⁶⁰ *Id.* at 20.

⁶¹ *Id.* at 21.

the contaminated groundwater.”⁶² However, the modest increase in time and difficulty pale in comparison to the profound difference in permanence and reduction of toxicity achieved by Alternative 4D.

3. EPA’s Consideration of Cost Is Flawed.

While “cost effectiveness” is a balancing factor,⁶³ it is not considered in a vacuum, and USEPA should not have given it the determinative weight that it did here.

It appears that USEPA chose Alternative 4B as the preferred remedy primarily based on cost. The selection of Alternative 4B as the preferred remedy hinges on a single sentence: “[D]igging deeper is not meaningfully more protective of potential users of the property and so does not justify the additional . . . \$22 million in estimated costs.”⁶⁴ USEPA’s conclusion lacks support.

First, this statement discounts the stated value—permanence—of fully removing the soil contamination. USEPA states that Alternative 4D is statutorily more protective: “Alternative 4D would be the *most protective* since all materials, including debris, would be excavated down to native sand and disposed of off-site.”⁶⁵ USEPA also noted that Alternative 4D “would eliminate potential exposure.”⁶⁶ In practical terms, the removal of thousands of tons of contamination sitting on top of the groundwater is “meaningfully more protective” of neighboring property owners who are in the path of that groundwater. The removal of the contamination is “meaningfully more protective” of people and wildlife that use the Calumet River, the Indiana Harbor Canal, and Lake Michigan. It is,

⁶² *Id.*

⁶³ 42 U.S.C § 9621 (2018).

⁶⁴ *PRODA*, *supra* note 13, at 22.

⁶⁵ *Id.* at 18 (emphasis added).

⁶⁶ *Id.*

simply put, “meaningfully more protective” not to live above a buried lead smelter, even if the top layer of that contamination has been scraped off. USEPA erred when it discarded Alternative 4D, without any scientific basis, on the grounds that the difference in protection is not “meaningful.”

USEPA’s analysis of cost is also flawed. USEPA relies on the cost differential of \$22 million—the maximum difference— to support its selection of Alternative 4B. This figure is improperly enlarged by two flawed assumptions. First, USEPA incorporates larger *construction* contingencies into their cost estimates for Alternative 4D (30%, or almost \$12m) than into Alternative 4B (10%, or \$2.4m). Had USEPA assumed a 10% contingency for Alternative 4D, then the differential would have been \$16m. Second, the analysis ignores *future* contingencies. Alternative 4D, as USEPA has stated, will not create future costs because it leaves no soil contamination behind.⁶⁷

USEPA guidance explains the circumstances in which cost can serve as a deciding factor: “Cost may play a significant role in selecting between options that appear comparable with respect to the other criteria, particularly long-term effectiveness and permanence.”⁶⁸ However, as discussed above, Alternative 4D and Alternative 4B are not comparable with respect to long-term effectiveness and permanence; Alternative 4D is permanent and effective over the long-term, but Alternative 4B is not. USEPA is supposed to start with the alternative that meets the statutory goals of permanence and treatment and then determine whether the cost is proportional to the effectiveness of the remedy;⁶⁹ it is not allowed to ignore permanence and, in response to cost, decide a lesser

⁶⁷ *PRODA*, *supra* note 13, at 16.

⁶⁸ *Guide*, *supra* note 47, at 4.

⁶⁹ USEPA, OSWER 9200.3–23FS, *The Role of Cost in the Superfund Remedy Selection Process*, 5 (1996), available at <https://semspub.epa.gov/work/HQ/174446.pdf>.

remedy is good enough. As discussed above, the implementability and short-term effectiveness factors do not contradict Alternative 4D. Instead, it seems USEPA impermissibly used cost as the deciding factor between two incomparable remedies.

As applied here, the Superfund remedy selection analysis also neglects the long-term, saved costs associated with a more protective plan.⁷⁰ Who wins if USEPA selects the less protective option? The companies, who profited off the land for decades, will pay less to address their pollution. Meanwhile, families whose lives have been permanently altered, at great economic and emotional cost, will remain in harm's way.

USEPA should adhere to its mission and protect people over profits by selecting Alternative 4D, which removes the most contamination and offers permanence.

C. The Community Does Not Accept USEPA's Preferred Remedial Alternative.

After hearing from residents during the comment period, USEPA must consider “community acceptance” as a modifying criterion.⁷¹ Public participation is a key principle of both Superfund⁷² and environmental justice,⁷³ and “community acceptance” is the criterion that effectuates this public participation in the remedy selection phase. USEPA guidance defines this criterion as “whether the local community agrees with the USEPA’s analyses and preferred alternative.”⁷⁴

⁷⁰ USEPA’s approach to cost comparison is incomplete because it looks only at the immediate costs of the particular cleanup and does not include the long-term costs that others would have to bear to bring the site back into actual productive use.

⁷¹ 40 C.F.R. § 300.430(e)(9)(iii)(I) (2018).

⁷² 42 U.S.C. § 9617 (2018).

⁷³ See *infra* note 84 and accompanying text.

⁷⁴ USEPA, EPA 540-R-98-031, OSWER 9200.1-23(P), PB98-963241, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, A-8 (1999), available at https://www.epa.gov/sites/production/files/2015-02/documents/rod_guidance.pdf.

To date, the most protective alternative, i.e. Alternative 4D, has received overwhelming popular support from the residents impacted by the contamination. The CAG is comprised of long time and life-long residents of the USS Lead Site, including former residents of Zone 1. Other community stakeholders have also stated that the contamination in Zone 1 should be removed, not buried as a potential problem for the future. These are the highly impacted residents that guidance suggests must be heeded in analyzing the community acceptance criterion.⁷⁵ At the public meeting on November 29, 2018, oral comments universally favored removing the contamination fully.⁷⁶ Moreover, the Mayor of East Chicago has also expressed support for Alternative 4D.⁷⁷

The CAG is aware of no one in the local community who accepts USEPA's preferred alternative, Alternative 4B. No one spoke at the public meeting in support of Alternative 4B. By contrast, many in the community—including the CAG—have vocally objected to the preferred Alternative 4B.

If USEPA selects remedy Alternative 4B, it will categorically ignore the voice of the community and fail to consider meaningfully the community acceptance criterion. As former Administrator Scott Pruitt said about East Chicago: “[I]t’s time to assess and make decisions and put the community first.”⁷⁸ The story of the USS Lead Site is a story about severe harm done to a community without the residents’ knowledge. Lead smelting companies contaminated this community throughout the twentieth century; housing

⁷⁵ *Id.* at 3-9.

⁷⁶ See *infra* section III.A. Several meeting participants were holding numbers when the meeting ended because of venue constraints. To properly analyze this criterion, USEPA must hold a second public meeting.

⁷⁷ Letter from Anthony Copeland, Mayor of East Chicago, IN, to USEPA (Dec. 4, 2018).

⁷⁸ Katie Mettler, *Escaping one of the nation's worst environmental disaster zones*, WASHINGTON POST (Aug. 20, 2017), https://www.washingtonpost.com/national/health-science/escaping-one-of-the-nations-worst-environmental-disaster-zones/2017/08/20/c0020fa8-77a7-11e7-8839-ec48ec4cae25_story.html?utm_term=.5ad6a260b0bd.

agencies built public housing on top of the known contamination; and multiple levels of government failed in their task of averting the health disaster at WCHC. USEPA now must choose between honoring the input of the impacted community or perpetuating more than 40 years of environmental injustice.

D. EPA Should Incorporate Carrie Gosch into the PRODA.

The Carrie Gosch School is part of Zone 1, but USEPA has omitted it—without explanation—from this PRODA and instead indicates only that the school will “remain covered by the remedy in the 2012 ROD.”⁷⁹

The lack of attention to the plans at Carrie Gosch belies the substantial and important uncertainty that remains about that portion of the site. Based on the 2012 ROD, USEPA presumably plans to treat “impacted soil” down to 24” on the school grounds.⁸⁰ In the meantime, though, USEPA has not explained whether it has conducted testing recently on the grounds of the school, and it has not shared results of any testing done after 2010.⁸¹

The lack of information about recent soil sampling at Carrie Gosch is concerning for two reasons. First, it is possible that nearby demolition activities led to increased deposition of contaminated soil or dust at the school. Second, Amereco’s Phase II Environmental Site Assessment calls for more investigation to characterize the boundaries of the contamination under the WCHC; this contamination may well extend under Carrie Gosch, but USEPA will not find out if it fails to investigate further. Further, at the public meeting, USEPA did not say when it would complete soil remediation on

⁷⁹ *PRODA*, *supra* note 13, at note 8.

⁸⁰ *2012 ROD*, *supra* note 1, at 48.

⁸¹ See *Sampling Data Viewer*, USS Lead Superfund Site Website, <https://epa.maps.arcgis.com/apps/MapSeries/index.html?appid=d45c8610b7364b8f931fdbb748d607c1>.

the grounds of the school—under the flawed 2012 plan—despite the fact that Carrie Gosch is already being used as a church and a day care facility.

Rather than relegating the Carrie Gosch portion of the site to secondary status, USEPA needs to do more to investigate and to address the needs at school site to ensure the safety of both adults and children who regularly visit the site. The PRODA must be amended to provide a more thorough analysis of the soil and groundwater at Carrie Gosch. A proper remediation there is overdue.

III. USEPA’s Approach to the PRODA Process Has Failed to Involve Impacted Residents Meaningfully.

A. Not All Residents Were Given the Opportunity to Speak at the Public Meeting.

We object to USEPA’s process for completing the PRODA. USEPA regulations explicitly state that the public should be afforded an opportunity to submit oral and written comments on the selection of a proposed remedy, including a proposed ROD amendment.⁸² The regulations also require USEPA to hold a public meeting for the plan.⁸³ In addition, USEPA’s obligation to promote environmental justice necessitates that residents have an opportunity for “meaningful input” in the decisionmaking process.⁸⁴

⁸² 40 C.F.R. § 300.430 (f)(3)(C).

⁸³ 40 C.F.R. § 300.430 (f)(3)(D).

⁸⁴ See Executive Order 12,898, “Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations.” 59 Fed. Reg. 7629 (Feb. 11, 1994). USEPA defines “meaningful involvement” so that “1) potentially affected populations have an appropriate opportunity to participate in decisions about a proposed activity [i.e., rulemaking] that will affect their environment and/or health; 2) the population’s contribution can influence [the USEPA’s] rulemaking decisions; 3) the concerns of all participants involved will be considered in the decision-making process; and 4) [the USEPA will] seek out and facilitate the involvement of population’s potentially affected by USEPA’s rulemaking process” Technical Guidance for Incorporating Environmental Justice into Regulatory Analysis, 9 (2016) (citing 2015 EJ Process Guidance), https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf.

Here, USEPA has literally silenced resident voices. Several residents were not given an opportunity to provide oral comment at USEPA’s November 29, 2018 public meeting. The CAG submitted a letter requesting a second public comment meeting, and USEPA agreed to schedule a January 10 meeting; USEPA then cancelled the meeting due to the government shutdown.

The need for a second public meeting stands, and USEPA should have postponed the comment deadline and allowed for a public meeting after the shutdown ends.⁸⁵ Given that the USEPA has not met its burden of community involvement, community preferences—as expressed in this comment and others submitted by residents in the community—should be afforded extra weight at the very least.

B. A Contingency Plan Amendment Introduces Unacceptable and Unnecessary Uncertainty

USEPA’s proposed amended cleanup plan includes the possibility of selecting a contingency plan amendment.⁸⁶ As outlined by USEPA, this contingency plan amendment would contain conditions that, if triggered, would change cleanup standards from entirely residential to industrial/commercial in some areas and residential in others.⁸⁷ We strongly object to such an inclusion because it strips the community of its agency and because USEPA’s own criteria for inclusion of such a contingency have not been met.⁸⁸

⁸⁵ In contrast, in matters involving the United States as a party, the Department of Justice sought and received two-week extensions. *See, e.g.*, “General Order Holding In Abeyance Civil Matters involving the United States as a Party,” General Order 18-0028 (N.D. IL 12/26/31).

⁸⁶ PRODA, *supra* note 13, at 3.

⁸⁷ *Id.*

⁸⁸ We also reject Alternative 4A—even for commercial/industrial. No matter the use, it will not be entirely covered with hardscape. Different industrial/commercial uses involve differing levels of exposure to contamination. Furthermore, in the PRODA, USEPA acknowledges the difficulty of maintaining perimeter grading and stormwater management with an asphalt cap that is

USEPA has offered no limiting factor on when a change in land use pursuant to a contingency could occur. This means that in the future the land use could change without community concerns being taken into account.⁸⁹

This divestiture of power of the impacted residents is particularly troubling given the environmental justice concerns in East Chicago. The contingency plan leaves the residents “disenfranchised from the local land use planning and development process,”⁹⁰ which is “an especially important issue where there are concerns regarding environmental justice in the neighborhood around the NPL site.”⁹¹ In this context, USEPA guidance requires that “[c]onsistent with the principle of fairness, USEPA should make an extra effort to reach out to the local community to establish appropriate future land use assumptions as such sites.”⁹² The contingency plan option makes no extra effort to ensure its land use assumption, if changed, will meet the community’s needs at that time.

USEPA has stated that including a contingency “would be appropriate only if, at the time of the ROD amendment, a sufficient level of certainty exists that an actual change in future land use to industrial/commercial is more probable than not to occur.”⁹³ There is now high certainty that the future land use of Zone 1 will be residential, and thus inclusion of such a contingency would be inappropriate and unnecessary under USEPA’s own standard.

expressly designed for environmental cleanup. Such operations would be much more difficult on an operating industrial/commercial site.

⁸⁹ It is unclear whether USEPA has committed to making a decision about the use and clean up levels before it submits the revised ROD and revised consent decree to the court. If USEPA does not need to make that choice before, then there could be effectively no review by anyone of USEPA’s decision.

⁹⁰ USEPA, OSWER Directive No. 9355.7-04, *Land Use in the CERCLA Remedy Selection Process* (“*Land Use*”), 6 (May 25, 1995).

⁹¹ *Id.*

⁹² *Id.*

⁹³ *PRODA*, *supra* note 13, at 4.

USEPA guidance states that USEPA's assumptions about future land use should come from discussions with the public, as well as local land use planning authorities and local officials.⁹⁴ Additionally, USEPA has enumerated a variety of factors that it should consider when determining reasonably anticipated future land use, of which several are key here: current land use, zoning, and environmental justice issues.⁹⁵

Direction from officials and residents, as well as consideration of factors that USEPA has articulated for its determinations in this context, unequivocally indicates that the current desired and appropriate land use for Zone 1 is residential. First, the West Calumet Housing Complex parcel was residential until the 2016 evacuation and demolition of the West Calumet Housing Complex and will remain zoned as residential.⁹⁶ Had the severity of lead exposure not forced this departure, the site likely would have remained a housing complex. Importantly, environmental justice issues are particularly acute in East Chicago, and accordingly the concerns of residents should be weighted heavily. The CAG members do not want any contingencies regarding land use included in the cleanup plan because this community desperately needs certainty and assurance. Finally, Mayor Copeland recently wrote a letter to USEPA where he articulated his plans for residential development in Zone 1:

My vision for the Calumet Neighborhood is that there will be new residential development there...[t]he City...intends to do residential in-fill development within the existing neighborhood once these areas have been remediated...[m]y preference for the land use in Calumet, including West Calumet has always been,

⁹⁴ "In order to ensure use of realistic assumptions regarding future land uses at a site, USEPA should discuss reasonably anticipated future uses of the site with local land use planning authorities, local officials, and the public, as appropriate, as early as possible during the scoping phase of the RI/FS." See *Land Use*, *supra* note 90, at 4.

⁹⁵ *Id.* at 5.

⁹⁶ USEPA, "Potential for Reuse: East Chicago, IN," <https://semspub.epa.gov/work/HQ/100001469.pdf>

and will continue to be new and revitalized residential development.⁹⁷

In sum, the relevant parties and factors support a residential land use designation for Zone 1. Now that any uncertainty has been eliminated USEPA should amend the PRODA to eliminate the contingency option.⁹⁸ Otherwise, USEPA makes a mockery of CERCLA's requirement for public participation.

C. USEPA Has Failed to Engage Residents in the Redevelopment Process

In its 2010 guidance on considering reasonable anticipated land use at Superfund sites, USEPA states that Regions should “solicit broad, diverse community input as part of the Superfund cleanup process;” it recommended that USEPA “consult with the site’s stakeholder community (i.e., local governments, community groups, the site’s owners, individuals, states, tribes, etc.) to obtain input on future use options and to discuss how particular remedies may affect a site’s future use options.”⁹⁹ The guidance document encourages USEPA to solicit input from the community because “early community involvement, with a particular focus on the community’s desired future uses of property associated with the CERCLA site, should result in a more democratic decision-making process”¹⁰⁰ and because “[i]mportant information about reasonably anticipated future land uses can be learned from community members.”¹⁰¹

⁹⁷ Letter from Mayor Anthony Copeland to USEPA, Dec. 4, 2018. While the letter mentions that developers have expressed interest in the site, the speculative interest of this nature has no place in USEPA consideration of land use when unsupported by any of the relevant factors.

⁹⁸ Nothing would stop USEPA from amending the ROD again if conditions change. Moreover, nothing would prevent the use of the site for commercial or industrial purposes if it is cleaned to a residential standard.

⁹⁹ USEPA, OSWER Directive 9355.7-19, *Considering Reasonably Anticipated Future Land Use and Reducing Barriers to Reuse at EPA-lead Superfund Remedial Sites* 3 (2010).

¹⁰⁰ *Id.* (citing USEPA, *Land Use in the CERCLA Remedy Selection Process* 1 (1995)).

¹⁰¹ *Id.* at 6.

USEPA's 2017 Superfund Redevelopment Task Force Report recommended that Regions take an even more active role in facilitating redevelopment plans for Superfund sites. This active role includes facilitating relationships between local stakeholders, PRPs, and communities,¹⁰² and "connect[ing] each [Superfund] community with a similarly situated community that has had revitalization success."¹⁰³ It also asks that USEPA provide information and/or training for community members and local government about the process of redeveloping a site including "envisioning and developing an economically feasible redevelopment plan for the site,"¹⁰⁴ and financing redevelopment.¹⁰⁵ Finally, it recommends that USEPA provide technical information about the site to parties interested in redevelopment including local government, community members, and potential developers.¹⁰⁶

¹⁰² USEPA, *Superfund Task Force Recommendations* 24 (2017) (Recommendation 39: "Facilitate interactions for local stakeholders/PRPs/communities to work together. Actively encourage PRPs to engage and be supportive of the process, demonstrating that an engaged community looking to the future can speed up cleanups, have realistic expectations, act as stewards, and promote successful reuse.").

¹⁰³ *Id.* at 24.

¹⁰⁴ *Id.* at 23. *See also* Recommendation 36: USEPA should "[p]rovide training/fact sheets/on-line information on . . . [h]ow the redevelopment of the site fits with a broader vision for the economic revitalization for the community" and on "[c]ommunity partners and other resources available to Superfund communities that can provide design charrettes, and other reuse visioning support."

¹⁰⁵ *Id.* at 22 (Recommendation 39: USEPA should "[f]acilitate and take a proactive approach in involving additional funding institutions/organizations."); *see also* Recommendation 36: USEPA should "[p]rovide training/fact sheets/on-line information on. . .[t]ools/approaches necessary for local governments . . . to encourage investment" and on "[f]unding/financing mechanisms . . . available to local communities."

¹⁰⁶ *Id.* at 20 (Goal 4, Strategy 1: "Reuse is further promoted when the community, including developers, has access to more information about an individual site and the sites around it. This includes determining which types of sites businesses/industries/developers are interested in potentially redeveloping and sharing information with them to promote Superfund site redevelopment."). USEPA listed the USS Lead Site as priority for redevelopment and it went to the trouble to produce a redevelopment fact sheet for businesses, which references the planned residential zoning for much of Zone 1, but did not seek input from residents and has not produced a thorough remediate plan that will facilitate residential development at the site. *See* <https://www.epa.gov/superfund-redevelopment-initiative/superfund-redevelopment-focus-list>.

Despite this official agency direction, USEPA has failed to solicit and incorporate community input regarding community members' preferred future use of Zone 1 sufficiently when it devised the proposed cleanup plan for Zone 1. Community members have expressed frustration about the lack of redevelopment planning for Zone 1.¹⁰⁷ Earlier action by the USEPA to facilitate discussion about the redevelopment of Zone 1 may have helped to achieve a shared vision for Zone 1's future use before the issuance of the PRODA. USEPA's more complete engagement may have eliminated its perceived need for USEPA's contingency plan in the Amended Plan, which has fostered greater uncertainty about the site's future.

Moving forward, although USEPA cannot dictate the future use of Zone 1, it should go further to meet the obligations and recommendations laid out in the 2010 guidance and the 2017 report. For example, USEPA should facilitate a visioning process for the future use of Zone 1. USEPA should also provide technical information or training to community members regarding working with potential developers and financing redevelopment so that community members are able to participate more fully in the city's decision-making process for the redevelopment of Zone 1.

D. USEPA Ignored the Most Up-to-Date Data on Zone 1's Site-Specific Conditions

Even though the understanding of the USS Lead Site contamination and health impacts has dramatically changed since 2016, the PRODA ignores new information. The Feasibility Study ("FS")—the more detailed study that underlies the PRODA—relies exclusively on the 2012 Remedial Investigation ("RI") as support for its analysis of the

¹⁰⁷ Craig Lyons, *East Chicago Residents Urge EPA for Better Cleanup Plan for West Calumet Site*, CHICAGO TRIBUNE (Nov. 30, 2018) (quoting a founder of Calumet Lives Matter regarding the redevelopment of Zone 1, "Why is nothing being done in Zone 1?")

Zone 1 contamination. The FS and the PRODA fail to consider how the information gained in Amereco's 2017 Phase II Environmental Site Assessment of the WCHC should impact its analysis. This is a substantial omission considering that the Phase II report details extreme contamination at great depth and raises the need for further study to understand fully the scope of contamination. How could USEPA make a decision about the plan for the site without conducting the recommended additional investigation?

Not only does the PRODA neglect new information about the soil contamination, it also relies on the defective 2012 Human Health Risk Assessment ("HHRA") in the FS; HHRA did not incorporate representative soil samples from Zone 1 and evaluated exposure pathways based on a future use where existing residential structures would remain in place. Moreover, the PRODA or FS should have acknowledged that the Agency for Toxic Substances and Disease Registry's ("ATSDR") 2018 report *corrected* its 2011 report that included the erroneous conclusion that "[b]reathing the air, drinking tap water or playing in soil in neighborhoods near the USS Lead Site is not expected to harm people's health."¹⁰⁸ The 2018 ATSDR report concluded, instead, that children living on the USS Lead Site were up to three times as likely to have elevated blood lead levels as the rest of East Chicago.

This up-to-date and site specific information should have been considered when developing a new plan for Zone 1.

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¹⁰⁸ ATSDR 2018 Health Consultation, *supra* note 6, at 16-17.

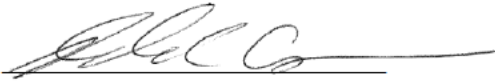
For the foregoing reasons, we urge USEPA to adopt Alternative 4D and finally promote environmental justice in this community.

Thank for you considering and responding to these comments. We welcome the opportunity to discuss them further.

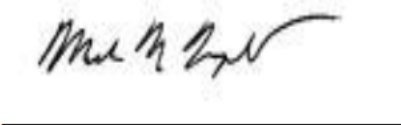
Respectfully submitted,



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March 13, 2019

By email to pope.janet@epa.gov

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Re: Supplemental Comment on USS Lead Superfund Site (EPA ID IND 005 174 354)
Proposed Record of Decision Amendment

Dear Ms. Pope,

The East Chicago Calumet Coalition Community Advisory Group (“CAG”), Northwestern Pritzker Law Environmental Advocacy Clinic, and the Abrams Environmental Law Clinic at the University of Chicago Law School submit these supplemental comments regarding the United States Environmental Protection Agency’s (“USEPA”) November 2018 Proposed Record of Decision Amendment (“PRODA”) for the USS Lead Superfund Site in East Chicago, Indiana. Based on new information gained after the submission of our January 14, 2019 comments, including statements made at USEPA’s second public meeting held on February 13, 2019, we feel compelled to submit these additional comments.

I. Introduction

We appreciate that USEPA, in response to public pressure, rescheduled the second public meeting regarding the PRODA for Zone 1 and extended the public comment period. This meeting afforded more residents the opportunity to speak about the proposed plan and to learn about USEPA’s PRODA.

Based on the PRODA and the two public meetings, however, we remain concerned that USEPA will select Alternative 4B despite its lack of protectiveness, permanence, and community acceptance. If USEPA overrides the strong opposition of the community and the City of East Chicago¹ to the PRODA’s preferred Alternative B, it will demonstrate to the community that USEPA values the polluters’ interests more than public health. We are also disturbed that despite the public knowledge that the state and federal governments ignored the severe level of

¹ Mayor Copeland’s January 14, 2019 Comment Letter, available at <https://semspub.epa.gov/work/05/946378.pdf>.

contamination at this site for decades, USEPA continues to downplay and dismiss the seriousness of the contamination in Zone 1.² We urge USEPA to reconsider its current plan and issue a revised PRODA that selects Alternative 4D.

In addition to the comments made in our January 14, 2019 letter, we request that USEPA address the following concerns:

1. The selection of Alternative B shifts the costs of remediation from the polluters to the community.
2. The lack of detail regarding the institutional controls (“IC”) precluded USEPA from completing the required analysis and prevented the community from fully understanding and evaluating the impact that ICs will have on future use at the site.
3. The plan to excavate soil to a depth of 24” does not reflect the site conditions.
4. USEPA lacks sufficient soil sampling to make an informed decision about the needed remediation at Carrie Gosch.
5. There is a need for the Agency for Toxic Substances and Disease Registry’s (“ATSDR”) to improve its existing health programs and develop a health surveillance program at the USS Lead Site.

II. USEPA Has Shifted the Burden Away from the Polluters to the Impacted Community.

USEPA’s selection of Alternative 4B represents a preference for polluters over impacted people and the environment. At the February 13, 2019 public meeting, USEPA stated, “[W]e’re going to end up negotiating, whatever remedy we choose, to get them on the hook because we want the polluter to pay.”³ USEPA has identified the responsible parties who are liable for the response costs under the Comprehensive Environmental Response, Compensation, and Liability Act (“CERCLA”).⁴ Yet, rather than requiring the polluters to pay the true cost for the removal of all of the contamination at the USS Lead Site, USEPA has proposed Alternative 4B which reduces the costs covered by the polluters and increases the costs to future homebuilders, utilities or the City of East Chicago. The polluters will only need to pay for the cost of removing the contamination to a depth of 24”; any future user or owner who needs or wants to dig sub-24” will need to incur the costs associated with removing extremely contaminated soil in accordance with a currently undefined, institutional control plan. This cost-shifting is not only inconsistent with

² For instance, despite the findings of the Amereco’s 2017 Phase II Environmental Site Assessment of Zone 1, available at <https://semspub.epa.gov/work/05/941443.pdf>, which indicate that lead and arsenic levels in groundwater exceed the applicable standard, USEPA stated at the February 13 meeting, “We looked at the current groundwater data that we have in Zone 1 specifically and the concentrations are fairly low.” February 13, 2019 Public Meeting Transcript (Boss Reporters), 38, line 2-5, available at <https://semspub.epa.gov/work/05/946308.pdf>. But, when challenged about that statement, EPA acknowledged, “[Y]ou are absolutely correct. Arsenic is high in the groundwater, . . .” *Id.* at 40-41, lines 24, 25, 1.

³ February 13, 2019 Public Meeting Transcript (Boss Reporters), 36, line 2-9.

⁴ 42 U.S.C. § 9601, et seq. (2018).

the “polluter pays” foundational principle of CERCLA, it also increases the risk to nearby residents; rather than a full site cleanup happening under controlled conditions, future remediation may happen lot by lot as the site is developed and when there may be residents living next door.

Even though USEPA’s public statements make clear that Alternative 4B will require future users to remove any contamination below 24” and will need to follow an institutional control plan,⁵ USEPA has not detailed or accounted for the institutional controls (“IC”).

III. USEPA has Created Confusion and Provided Inadequate Detail Regarding the Use of ICs.

USEPA has failed to provide sufficiently detailed descriptions of the ICs, including what steps the landowners or utilities will need to take in order to dig deeper than 24” and the full costs associated with implementing these ICs. USEPA disregarded its own guidance, *Institutional Controls: A Site Manager’s Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups*;⁶ this guidance instructs USEPA to state clearly which ICs it will use in the final Zone 1 remedy;⁷ what potential ICs would be required of residents, the city, or future developers; and evaluate the potential IC remedies using the same nine evaluative criteria, outlined in the National Contingency Plan⁸ that apply to the remedies as a whole. Without specific information about potential ICs, residents, community groups, and the city are unable to assess fully the impact of USEPA’s planned ICs and were thus unable to comment on their implementation. Residents and the community groups have significant questions about the content of potential ICs as a result.

A. USEPA Failed to Fully Account for the Cost of the ICs.

In the PRODA or underlying Feasibility Study (“FS”), USEPA neither described with sufficient specificity the cost of implementing fully protective ICs nor indicated that it will need to evaluate the effectiveness of the ICs as part of the five-year review. When developing a cost estimate, USEPA must account for a variety of costs that accompany the implementation and enforcement of ICs including the “legal fees associated with obtaining easements restricting land use, the costs of purchasing property rights . . . or the wages of the state or local government personnel that will regularly monitor the IC to ensure that it has not been violated.”⁹ USEPA must also consider the costs of the mandatory five-year reviews.¹⁰ USEPA’s guidance document

⁵ February 13, 2019 Public Meeting Transcript, 52-53 (“In this case, it would mean that someone digging below 2 feet would have to follow a plan to appropriately manage the soils below 2 feet because we know that those soils could be contaminated, that they were not cleaned up. So you need to follow a plan to make sure nobody gets exposed when you’re digging below that depth.”)

⁶ US Environmental Protection Agency, OSWER Directive 9355.0-74FS-P, *Institutional Controls: A Site Manager’s Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups* (2000).

⁷ Even if USEPA does not “identify the exact IC” that it will use in its final remedy, “the critical evaluation of the available ICs should still be conducted and the specific objective(s) of the ICs should be clearly stated in the Record of Decision (“ROD”) or other decision document.” *Id.*

⁸ *Id.* at 7.

⁹ *Id.* at 8

¹⁰ 40 CFR § 300.430(f)(4)(ii).

notes that the cost of an incomplete cleanup plus the cost of fully protective ICs may be greater than the cost of fully cleaning the land in the first instance.¹¹

Here, the PRODA does not list separately the costs of the IC. The FS lists the IC costs as \$21,000, and describes them as preparing the plans and meetings with agencies for a total of 140 hours total.¹² It does not reference the costs of personnel who will monitor the IC compliance. In addition, the total number of hours seems extremely small considering the ongoing need for IC monitoring and implementation. USEPA should revise the PRODA to provide (1) a full accounting for all costs associated with ICs and (2) evaluate whether the long-term cost of implementing ICs is cost effective as compared to the full cleanup in Alternative 4D, which does not require any ICs.

B. USEPA Did Not Engage the Community or Local Government in Developing the ICs.

USEPA's guidance also recommends that USEPA engage in "discussions with the local government and community" about the potential ICs in order to fulfill EPA's duty to gain community acceptance of the PRODA.¹³ Yet, for Zone 1, USEPA did not attempt to solicit input specifically about potential ICs. USEPA has mentioned ICs in passing, potentially leading some residents to assume incorrectly that ICs are only a protective measure and that the ICs have no associated burdens or costs. While ICs are indeed a protective measure for future users of Zone 1, ICs are accompanied by significant costs to USEPA, future developers, the community, and residents, and ICs are necessary only if USEPA does not do a full cleanup of Zone 1.

C. USEPA's Statements about ICs at the Public Meetings Have Differed from the Written Statements Included in the PRODA and FS.

Further, during the public meetings, USEPA officials mentioned that ICs would be required under Alternative 4D even though the PRODA states explicitly that ICs would not be required under 4D because 4D will not leave any contaminated soil.¹⁴ The PRODA expressly indicates in several places that Alternative 4D does not include institutional controls, and explains that 4D "provides the greatest degree" of long-term effectiveness, requiring no operation and maintenance or institutional controls.¹⁵ The FS also includes a comparison table of the remedial alternatives that states that 4D "will not require institutional controls."¹⁶ The inconsistency between the written documents and the statements at the public meetings is

¹¹ USEPA, OSWER Directive 9355.0-74FS-P, *supra* note 6, at 8 ("It is interesting to note that once the total life-cycle costs of implementing, monitoring, and enforcing an IC – which may exceed 30 years – are fully calculated, it may actually be less costly in the long term to implement a remedy that requires treatment of the waste.").

¹² USEPA, Feasibility Study Report for USS Lead OU1 Zone 1 Site East Chicago, Indiana (2018) (Feasibility Study), Table 4-7.

¹³ *Id.* at 9 ("Discussions with the local government and community give the site manager the opportunity to: Gather local government and community input on the proposed ICs; Identify whether a particular stakeholder group may be harmed as a result of a proposed IC . . . ; Receive comment on the impacts of the potential ICs on religious or cultural customs and beliefs . . . ; Determine if the community has special needs in regards to the IC.").

¹⁴ Compare Transcript of USS Lead Proposed Plan Zone 1 Public Meeting, Nov. 29, 2018, 17, 24 with Proposed Record of Decision Amendment for USS Lead Site, 16.

¹⁵ See CAG, et al, January 14 comments, 15; PRODA, 16, 19,

¹⁶ Feasibility Study, Table 3-1, at 3-7.

confusing for residents, and may lead them to believe that plans 4B and 4D are not substantially different even though 4D is a full clean-up and 4B is not. USEPA should have engaged residents in a more detailed and thorough discussion about the benefits and costs of ICs and incorporated residents' feedback into the final PRODA. For these reasons, USEPA would be in error if it assumed that fewer public comments on the ICs meant that there was community acceptance of the ICs.

D. USEPA Has Not Factored in the Hardship that Alternative 4B's ICs Will Impose on the Community.

Finally, USEPA also should "identify whether a particular stakeholder group may be harmed as a result of a proposed IC (for example, will a ban on fishing cause an economic hardship in the community)."¹⁷ For this environmental justice community and the City of East Chicago where there is insufficient supply of affordable housing, the use of ICs that impose restrictions and additional costs for excavation at depths below 24", the economic hardship is substantial.

Even if the cost of USEPA's Alternative 4B remediation including the implementation of ICs is less than the cost of a full cleanup under Alternative 4D, the costs of the ICs associated with Alternative 4B will burden residents and the city. Considering that the future use is residential and the Indiana Building Code requires footings be placed at least as deep as 36,"¹⁸ we know that homebuilders and the City of East Chicago will need to dig deeper than the 24" and will need to follow some type of ICs.

ICs substantially increase the cost of construction, which discourages contractors from developing the land and which requires that the community expend extra resources to find contractors willing to take on the risk. Contractors who are willing to accept the risk will charge the community higher prices. ICs also place extra restrictions on land once it has been developed. These restrictions may lower a property's value below what its value would be if it were fully cleaned up and not placed under restrictions. USEPA should account for these costs in its decision to select a particular cleanup plan and ICs because these costs are associated with the implementation and enforcement of ICs,¹⁹ and they will impact the financial well-being of the community long after USEPA has finished its cleanup.

At the end of the day, those who are responsible for the pollution in this community should bear the full costs of cleaning it up; USEPA should not allow those polluters to shift the costs to the community.

IV. USEPA's Application of the Residential Standard of 24" is Inappropriate Here.

USEPA's plan to excavate only to 24" does not reflect the site-specific conditions of Zone 1. In Zones 2 and 3 or other Superfund sites where USEPA has employed a 24" excavation

¹⁷ USEPA, OSWER Directive 9355.0-74FS-P, *supra* note 6, at 9.

¹⁸ 675 IAC § 14-4.3-6

¹⁹ USEPA, OSWER Directive 9355.0-74FS-P, *supra* note 6, at 8 ("In CERCLA, estimated costs for implementing, monitoring, and enforcing ICs should be developed.").

plan, existing residential structures remain and USEPA assumes that residents are unlikely to dig below 24” and therefore unlikely to encounter soil contamination below that depth. The current owner of the Zone 1, the City of East Chicago, has indicated clearly that it plans to use the West Calumet Housing Complex and Goodman Park areas for residential purposes.²⁰ Accordingly, Zone 1’s expected future users will necessarily dig sub-24” because Indiana Building Code requires the placement of footings at a depth of at least 36.” This means known contamination will be encountered below 24.”

At the February 13, 2019 meeting, we asked whether USEPA has applied this approach at other comparable sites; in response, USEPA provided a list of “comparable sites” where USEPA excavated to a depth of 24” or less.²¹ Yet, none of these sites is actually comparable. None had the same combination of (a) extreme contamination at depths below 24”, (b) the lack of residential housing at the time of cleanup, and (c) plans to build new residential structures after remediation.

V. USEPA Should Gather More Soil Samples at Carrie Gosch, and Engage the Public in Developing an Updated Remediation Plan for that Area of the USS Lead Site.

While we commend USEPA for expediting remediation of the soil surrounding Carrie Gosch School, we have many outstanding questions. As a preliminary matter, and as addressed in our January 14 comments, at that time, we could not find any soil sampling data collected at Carrie Gosch other than the 2010 data on the USEPA’s web viewer. With USEPA’s assistance, we now have found and reviewed soil-sampling data from 2015;²² we remain concerned that USEPA lacks adequate sampling information to make an appropriate decision about the extent of contamination in that area of the USS Lead Site.

A review of the soil sampling for Carrie Gosch reveals three issues. First, an insufficient number of samples formed the basis of USEPA’s decision on how to address the Carrie Gosch contamination. From the available data and reports, SulTrac, the contractor, planned on taking approximately 4 samples at Carrie Gosch—the same number of samples it planned to take at each residential property.²³ It appears from the 2015 data that *at most* a total of 9 or 10 sampling locations were tested and, of that group, only 6 involved testing deeper than 24.”²⁴ The number of samples taken at an approximately 15-acre site seems rather small, especially considering that it is known that contamination was identified there in the late 1990s, and no records have been made available which establish that it ever was remediated.

²⁰ Mayor Copeland’s January 14 Comment Letter, *supra* note 1.

²¹ See Exhibit A. List of “Comparable Sites.”

²² See Exhibit B. Soil Sampling Data, Carrie Gosch, as downloaded from USEPA Webviewer, USS Lead Site.

²³ SulTrac Amended Field Sampling Plan (July 6, 2010), Table A-1A, available at <https://semspub.epa.gov/work/05/424394.pdf>. In SulTrac’s Quality Assurance Project Plan and Revised Soil Sampling Plan, SulTrac explained the testing that would be done as part of the RI/FS process, SulTrac indicated it would take a total of 4 composite samples at Carrie Gosch. See SulTrac Remedial Investigation/Feasibility Study Amended Quality Assurance Project Plan, Worksheet # 14, available at <https://semspub.epa.gov/work/05/424378.pdf>;

²⁴ *Id.* See also SulTrac Amended Field Sampling Plan, Table A-1A. It is difficult to know if the 2015 sampling merely replicated that sampling or if it expanded the sampling.

Second, for the samples it did take, USEPA relied too heavily on X-ray Fluorescence ("XRF") testing, which—according to EPA's own documents—is not a scientifically accurate or appropriate way to test for arsenic particularly when arsenic and lead are present together.²⁵ Indeed, for Zone 2 testing that was completed in 2016-2017, USEPA switched to doing laboratory testing for all the soil samples. USEPA should redo its Carrie Gosch soil sampling and send all samples to the laboratory.

Third, it is quite possible that either demolition of the West Calumet Housing Complex or soil excavation of nearby homes may have caused further contamination of the Carrie Gosch area. At the February 13, 2019 public meeting, USEPA specifically noted that the air monitoring alarms were triggered during the demolition; at the point that any alarms were set off, dust with lead and arsenic was in the air and likely left the site. Accordingly, the only way to understand the impact of fugitive dust emissions on the soil at the Carrie Gosch area is to sample it.

We urge USEPA to undertake further soil sampling and engage the public in a proposed remediation plan for Carrie Gosch. Since 2012, when the Record of Decision was originally issued, the 2017 Amereco Phase II Environmental Site Assessment and the Agency for Toxic Substances and Disease Registry's ("ATSDR") 2018 Health Consultation Report have raised additional concerns about the lead and arsenic contamination in all of Zone 1.

VI. USEPA Should Incorporate Expanded Health-Related Programs into the PRODA.

As noted above, the availability of updated information about the health consequences of the residential exposure to toxics at the site supports the need for measures to protect current and former residents of the USS Lead Site. ATSDR should develop a health surveillance program in coordination with the Indiana State Department of Health, the Indiana Family Social Service Administration, and the East Chicago Department of Health. It should also work with the National Center on Environmental Health and other partners to establish a USS Lead Site Registry to ensure that all impacted people can participate in health studies and screenings. ATSDR should also do more to follow through on its suggested public health actions to increase lead blood testing and access to appropriate resources to reduce the risk.

A. ATSDR Should Encourage and Support Additional Health Testing, Education, and Other Health Programs.

In its August 2018 Health Consultation, ATSDR concluded that children in Zones 1 and 2 were three times more likely to have elevated blood lead levels than children in other parts of industrialized East Chicago.²⁶ ATSDR's Consultation makes multiple recommendations to address the urgent public health problem: (1) encourage blood lead testing; (2) provide additional healthcare provider education programs to increase blood lead testing; (3) follow-up with case

²⁵ See EPA Region 4, Science and Ecosystem and Support Division, Field X-Ray Fluorescence Measurement 6 (2015), attached hereto as Exhibit C (explaining that when lead and arsenic are present in the same soil, XRF would not be an appropriate way to test for arsenic); Dennis J. Kalnicky & Raj Singhvi, Portable XRF Analysis of Environmental Samples, J. Hazardous Materials 83, 93–122 (2001), attached as Exhibit D.

²⁶ ATSDR, Health Consultation, 3 (Aug. 8, 2018), available at https://www.atsdr.cdc.gov/HAC/pha/USSmelterandLeadRefinery/US_Smelter_Lead_Refinery_HC_2018-508.pdf

management for children who relocated from the West Calumet Housing Complex; (4) work with the City of East Chicago to promote lead abatement resources; and (5) develop a targeted, educational outreach for families with young children.²⁷ Importantly, these are the same measures that ATSDR has been recommending prior to its 2018 Health Consultation. The 2018 findings have not generated any increase of activity or new action. There has been no tracking or public reporting on the effectiveness and reach of these programs at any time.

These new findings compel USEPA and ATSDR to evaluate the effectiveness and applicability of health programs that have been implemented at other Superfund sites, such as door-to-door education and health screening of residents for lead, arsenic and other heavy metals, distribution of HEPA-filter vacuums, and exterior lead-based paint stabilization or abatement.

B. ATSDR Should Undertake a Health Surveillance Program and Establish a Registry.

The 2018 Consultation determined that there is a significant increased risk of health effects from exposure to hazardous substances. ATSDR's 2018 report explains another role of Health Consultations in promoting public health:

In addition, consultations may recommend additional public health actions, such as conducting *health surveillance activities to evaluate exposure or trends in adverse health outcomes*; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members (emphasis added)²⁸

Accordingly, we urge ATSDR to take the critical next step and create an official health surveillance program that will involve regular blood testing and other screening—including a dental program—to provide early identification and appropriate referral when residents present with illnesses that stem from exposure to lead, arsenic and other contaminants found at the USS Lead Site. This health surveillance program also will facilitate greater understanding of trends related to “adverse health outcomes.”²⁹ Indeed, CERCLA mandates that ATSDR initiate health surveillance programs in cases such as this: When ATSDR determines “that there is a significant increased risk of adverse health effects in humans from exposure to hazardous substances,”

²⁷ *Id.* at 17-18.

²⁸ *Id.* (opening pages).

²⁹ ATSDR has issued guidance on evaluating the appropriateness of medical monitoring. See ATSDR's Final Criteria for Determining the Appropriateness of a Medical Monitoring Program under CERCLA, 60 Fed. Reg. 38840 (July 28, 1995). The USS Lead Site meets these criteria. For medical monitoring to be appropriate, a site must meet both the “exposure criteria” and “outcome criteria.” 60 FR at 38841. The exposure criteria is analyzed by ATSDR in “Phase I” and contains two elements: 1) there should be evidence of contaminant levels in environmental media that would suggest the high likelihood of environmental exposure to a hazardous substance and subsequent adverse health outcomes; and 2) there should be a well-defined, identifiable target population of concern in which exposure to a hazardous substance at a sufficient level has occurred. *Id.* The outcome criteria are then analyzed in Phase 2 with input from the community, and state and local health officials. *Id.* The “outcome criteria” analysis also has two elements: 1) a scientific basis for associating exposure to adverse health effects; and 2) the adverse effects monitored for should be consistent with the existing body of knowledge and amenable to prevention and intervention. *Id.*

ATSDR “shall initiate a health surveillance program.”³⁰ These health surveillance programs are recoverable costs under Section 107 of CERCLA, and USEPA should incorporate this vital program into the amended Record of Decision and the forthcoming amended Consent Decree with the polluters.

The creation of a registry,³¹ funded in part by ATSDR and the National Center for Environmental Health, is also appropriate considering that many residents who had been exposed to contamination on the USS Lead Site have moved off the site, but face greater risks of developing cancer or other site-related diseases. The recently announced Flint Registry may provide some relevant and transferrable lessons.³² The unique conditions of the chronic exposures to multiple contaminants and the cumulative impacts of the exposures at the USS Lead Site should guide the development of these programs.

VII. Conclusion

At the February 13 meeting, the CAG Co-Chair Akeeshea Daniels posed the essential question:

How many more deaths, how many more chemicals are you going to have to find, how many more people, children, are going to keep being poisoned for you all to come to just a decision that 4D is what's best, regardless of the money issue.³³

USEPA has the opportunity to demonstrate its commitment to developing a plan that protects public health and the environment.

USEPA should revise the PRODA to adopt Alternative 4D. It should demonstrate its preference for public health over the polluters' profits; it should adopt the plan that will enable residents to move forward in restoring its residential community on land that is safe. USEPA should also undertake additional sampling at Carrie Gosch to ensure that the remediation there is adequate, particularly since we know that families with children are regularly using that facility. ATSDR should establish a health surveillance and registry program, and step up its other health efforts in the community, and recover the costs of those efforts from the polluters.

³⁰ 42 U.S.C. § 9604(i)(9).

³¹ 42 U.S.C. § 9604(i)(7).

³² See <https://flintcares.com/registry/> (“voluntary secure registry which will aim to connect them to programs and others resources that serve to minimize the effects of lead on their health while promoting wellness and recovery.”)

³³ February 13 Transcript, *supra* note 3, at 34, lines 2-9.

Thank for you considering and responding to these comments.

Respectfully submitted,



Maritza Lopez



Akeeshea Daniels

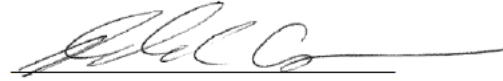


Tara Adams

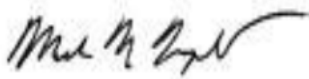


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EXHIBIT A

USEPA List of “Comparable Sites”

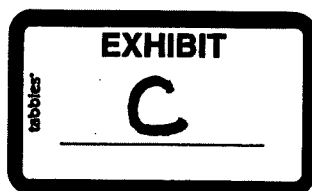
Site Name	Site Location	Depth of Excavation
Eureka Smelter	Eureka, NV	1 foot
Eureka Mills	Eureka Mills, UT	18 inches
Medford Housing Authority	Medford, CT	1 foot
Southwest Jefferson County Mining	Jefferson County, MO	1 foot, 2 feet in gardens
Washington County Lead District – Potosi	Potosi, MO	1 foot, 2 feet in gardens
Washington County Lead District – Old Mines	Old Mines, MO	1 foot, 2 feet in gardens
Washington County Lead District – Richwoods	Richwoods, MO	1 foot, 2 feet in gardens
Washington County Lead District – Furnace Creek	Caledonia, MO	1-2 feet
Madison County Mines	Fredericktown, MO	2 feet
Oronogo-Duenweg Mining Belt	Joplin, MO	1 foot
Cherokee County	Galena, KS	1 foot
Omaha Lead	Omaha, NE	1 foot
Bunker Hill Mining & Metallurgical Complex	Smelterville, ID	1-2 feet
Le Roi Co Smelter	Northport, WA	1-2 feet
Jacksonville Ash	Jacksonville, FL	2 feet
Brown’s Dump	Jacksonville, FL	2 feet
Anniston Lead	Anniston, AL	1-2 feet
Southside Chattanooga Lead Site	Chattanooga, TN	2 feet

EXHIBIT B

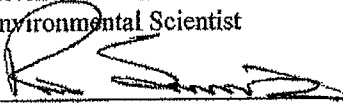

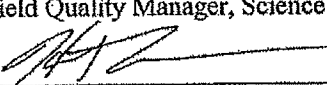
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2	Lab	101	0	6	Lead	88	8/11/2010, 7:00 PM Final
3	Lab	101	6	12	Arsenic	4	8/11/2010, 7:00 PM Final
4	Lab	101	6	12	Lead	69	8/11/2010, 7:00 PM Final
5	Lab	101	12	18	Arsenic	3	8/11/2010, 7:00 PM Final
6	Lab	101	12	18	Lead	46	8/11/2010, 7:00 PM Final
7	Lab	101	18	24	Arsenic	3	8/11/2010, 7:00 PM Final
8	Lab	101	18	24	Lead	28	8/11/2010, 7:00 PM Final
9	Lab	101	0	6	Arsenic	5	8/11/2010, 7:00 PM Final
10	Lab	101	0	6	Lead	120	8/11/2010, 7:00 PM Final
11	Lab	101	6	12	Arsenic	7	8/11/2010, 7:00 PM Final
12	Lab	101	6	12	Lead	162	8/11/2010, 7:00 PM Final
13	Lab	101	12	18	Arsenic	6	8/11/2010, 7:00 PM Final
14	Lab	101	12	18	Lead	159	8/11/2010, 7:00 PM Final
15	Lab	101	18	24	Arsenic	5	8/11/2010, 7:00 PM Final
16	Lab	101	18	24	Lead	132	8/11/2010, 7:00 PM Final
17	Lab	101	0	6	Arsenic	7	8/11/2010, 7:00 PM Final
18	Lab	101	0	6	Lead	106	8/11/2010, 7:00 PM Final
19	Lab	101	6	12	Arsenic	10	8/11/2010, 7:00 PM Final
20	Lab	101	6	12	Lead	107	8/11/2010, 7:00 PM Final
21	Lab	101	12	18	Arsenic	11	8/11/2010, 7:00 PM Final
22	Lab	101	12	18	Lead	80	8/11/2010, 7:00 PM Final
23	Lab	101	18	24	Arsenic	7	8/11/2010, 7:00 PM Final
24	Lab	101	18	24	Lead	68	8/11/2010, 7:00 PM Final
25	Lab	101	0	6	Arsenic	6	8/11/2010, 7:00 PM Final
26	Lab	101	0	6	Lead	145	8/11/2010, 7:00 PM Final
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30	Lab	101	12	18	Lead	131	8/11/2010, 7:00 PM Final
31	Lab	101	18	24	Arsenic	8	8/11/2010, 7:00 PM Final
32	Lab	101	18	24	Lead	46	8/11/2010, 7:00 PM Final
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34	Lab	101	0	6	Lead	350	4/30/2015, 7:00 PM FINAL
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36	Lab	101	6	12	Lead	230	4/30/2015, 7:00 PM FINAL
37	Lab	101	18	24	Arsenic	11	4/30/2015, 7:00 PM FINAL
38	Lab	101	18	24	Lead	810	4/30/2015, 7:00 PM FINAL
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41	XRF	101	6	12	Arsenic	9	8/19/2015, 7:00 PM
42	XRF	101	6	12	Lead	43	8/19/2015, 7:00 PM
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51 XRF	101	24	30	Arsenic	9	5/4/2015, 7:00 PM
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56 XRF	101	6	12	Lead	71	5/5/2015, 7:00 PM
57 XRF	101	12	18	Arsenic	12	5/5/2015, 7:00 PM
58 XRF	101	12	18	Lead	85	5/5/2015, 7:00 PM
59 XRF	101	18	24	Arsenic	11	5/5/2015, 7:00 PM
60 XRF	101	18	24	Lead	78	5/5/2015, 7:00 PM
61 XRF	101	24	30	Arsenic	55	5/5/2015, 7:00 PM
62 XRF	101	24	30	Lead	478	5/5/2015, 7:00 PM
63 XRF	101	12	18	Arsenic	17	5/5/2015, 7:00 PM
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71 XRF	101	12	18	Arsenic	9	5/5/2015, 7:00 PM
72 XRF	101	12	18	Lead	40	5/5/2015, 7:00 PM

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Region 4
U.S. Environmental Protection Agency
Science and Ecosystem Support Division
Athens, Georgia

OPERATING PROCEDURE	
Title: Field X-Ray Fluorescence Measurement	
Effective Date: December 18, 2015	Number: SESDPROC-107-R3
Authors	
Name: Kevin Simmons Title: Environmental Scientist	
Signature: 	Date: 12/18/15
Approvals	
Name: John Deatrick Title: Chief, Field Services Branch	
Signature: 	Date: 12/18/15
Name: Hunter Johnson Title: Field Quality Manager, Science and Ecosystem Support Division	
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United States Environmental Protection Agency (US EPA). Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment, Method 6200, Revision 0, February 2007.

US EPA. 2001. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. Region 4 Science and Ecosystem Support Division (SESD), Athens, GA.

US EPA. Safety, Health and Environmental Management Program Procedures and Policy Manual. Region 4 SEDS, Athens, GA, Most Recent Version.

1.5 General Precautions

1.5.1 Safety

Proper safety precautions must be observed when conducting field XRF measurements. Refer to the SEDS Safety, Health and Environmental Management Program Procedures and Policy Manual and any pertinent site-specific Health and Safety Plans (HASPs) for guidelines on safety precautions. These guidelines, however, should only be used to complement the judgment of an experienced professional. When using this procedure, minimize exposure to potential health hazards through the use of protective clothing, eye wear and gloves. The operator should always be aware of the instrument's radioactive source and the direction of its beam of X-rays. The operator should never point the open source at anyone. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate.

1.5.2 Procedural Precautions

All field XRF measurements pertinent to the sampling event are recorded in a bound field record logbook for the event. This record is created and maintained by the analyst providing the field XRF support. After the investigation is complete, the analyst will conduct post-processing of the field measurements and will enter final measurement data in the SEDS laboratory information management system and provide the SEDS project leader with a copy of the field measurement logbook. All other records and documentation of the investigation should be recorded according to the procedures outlined in the SEDS Operating Procedure for Logbooks (SESDPROC-010).

1.5.3 Limitations

There are three main sources of interference in XRF analysis that may impact data quality. They are sample preparation error, spectral interferences and chemical matrix interferences.

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2 Operational Checks and Quality Control

All XRF instruments shall be maintained and operated in accordance with the manufacturer's instructions, EPA Method 6200 and the SESD Operating Procedure for Equipment Inventory and Management (SESDPROC-108). Prior to each operational period, the instrument is turned on and is allowed to perform an internal calibration. Following this calibration, a performance check is conducted, using the appropriate National Institute of Standards and Technology (NIST)-traceable standard reference material for the analytes of concern. The value should be within +/- 20% of the stated value of the standard. Following this performance check, an instrument blank sample is analyzed to verify the instrument is not registering false positive results for the analytes of concern. After these checks, the instrument is ready for analysis.

The following operational and quality control requirements also apply to operation of the XRF instrument and must be followed and documented in the field logbook maintained by the analyst:

- During operations, the ambient air temperature will be recorded for each measurement and if the ambient temperature changes by more than 10°F, the instrument will be recalibrated.
- A method blank is analyzed at least once a day to determine if contamination is entering the analytical procedure.
- While the instrument is being used, the reference standards and the blank are run once each hour or every twenty samples, whichever occurs first, and also at the end of the period of operation, prior to turning the instrument off.
- For every twenty samples, or at least once per day, analyze a duplicate using the main sampling technique.
- Once per day, check the instrument's precision by analyzing one of the site samples at least seven times in replicate.

EPA Method 6200 contains detailed instruction and guidance covering implementation of these procedures and any corrective actions that must be taken based on measured instrument behavior and performance. If at any time during a field investigation, it appears that the environmental conditions could jeopardize the quality of the measurement results, the measurements will be stopped. This will be documented in the field logbook.

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Sampling (SESDPROC-200). After mixing, the media being sampled may be placed in either an 8-ounce glass container or a clean, unused zip-closure plastic bag (or equivalent). The XRF analyst then takes an aliquot from the container and places it in a small plastic cup with a Mylar® covering. The cup containing the sample is then loaded into a tray for analysis by the XRF instrument. Alternatively, if project objectives allow, measurements may be obtained by reading directly through the plastic bag. Window opening time considerations are the same as for the in situ measurement procedures described in Section 3.2.1.

The concentrations reported for the samples analyzed by the cup method are representative of the interval sampled, i.e., if the sampler collected the sample from the interval of 0 to 3 inches below ground surface, the reported concentration, assuming thorough homogenization, will be an average of the concentrations over that interval.

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screened locations to generate site-specific moisture limiting factors. This correlation factor can be used to develop a sampling scheme with more confidence.

Using these relationships, the following scheme may be implemented:

- Ten percent of the samples that screen at concentrations less than approximately 70% - 80% (or other correlation factor developed on actual data) of the site action levels are submitted for confirmation analyses to confirm that concentrations are, in fact, below the site action levels.
- All of the samples that screen at concentrations of 70% - 80% (or other correlation factor developed on actual data) of the action level up to the action level value are submitted for confirmation analyses to confirm that concentrations are, in fact, equal to or greater than the site action levels.
- Ten percent of the samples that screen at concentrations exceeding the action levels are submitted for confirmation analyses to confirm that concentrations are, in fact, greater than the site action levels.



Field portable XRF analysis of environmental samples

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Abstract

One of the critical factors for successfully conducting contamination characterization, removal, and remedial operations at hazardous waste sites is rapid and appropriate response to analyze samples in a timely fashion. Turnaround time associated with off-site analysis is often too slow to support efficient utilization of the data. Field portable X-ray fluorescence (FPXRF) techniques provide viable and effective analytical approaches to meet on-site analysis needs for many types of environmental samples. Applications include the in situ analysis of metals in soils and sediments, thin films/particulates, and lead in paint. Published by Elsevier Science B.V.

Keywords: XRF; Field portable XRF; Environmental; In situ; Soil contamination; On-site

1. Introduction

One of the critical factors for successfully conducting extent of contamination, removal, and remedial operations at hazardous waste sites is rapid and appropriate analytical support to analyze site samples in a timely fashion. Historically, there have been problems obtaining high quality sample analysis results within a time frame necessary to support efficient utilization of the data. Field portable X-ray fluorescence (FPXRF) spectrometry has become a common analytical technique for on-site screening and fast turnaround analysis of contaminant elements in environmental samples. Applications include the in situ analysis of metals in soils and sediments, thin films/particulates, and lead in paint. FPXRF is a non-destructive analytical technique that allows both qualitative and quantitative analysis of the composition of a sample.

XRF spectrometry has been utilized in the laboratory for many years. Portable XRF technology has gained widespread acceptance in the environmental community as a viable

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analytical approach for field applications due to the availability of efficient radioisotope source excitation combined with highly sensitive detectors and their associated electronics. While wavelength dispersive XRF has been the mainstay of laboratory instrumentation, energy dispersive XRF (EDXRF) is the technique of choice for field instrumentation primarily due to the ease of use and portability of EDXRF equipment. FPXRF instruments can provide both qualitative and quantitative analysis of environmental samples, and in some cases, without the need for site specific standards.

2. Theory

Atoms fluoresce at specific energies when excited by X-rays. Detection of the specific fluorescent photons enables the qualitative and quantitative analysis of most elements in a sample [1–3]. The mechanism for the X-ray fluorescence of an atom is illustrated in Fig. 1. An inner shell vacancy is created (by an incident X-ray photon or other phenomena) leaving an electron hole in the inner shell. An outer shell electron falls to fill the inner shell vacancy as the atom relaxes to the ground state. This process gives off photons with energy in the X-ray region of the electromagnetic spectrum equivalent to the energy difference between the two shells.

Each atom has an X-ray line spectrum that consists of a series of discrete energies with intensities related to the probability that a particular transition will occur. The X-rays emitted

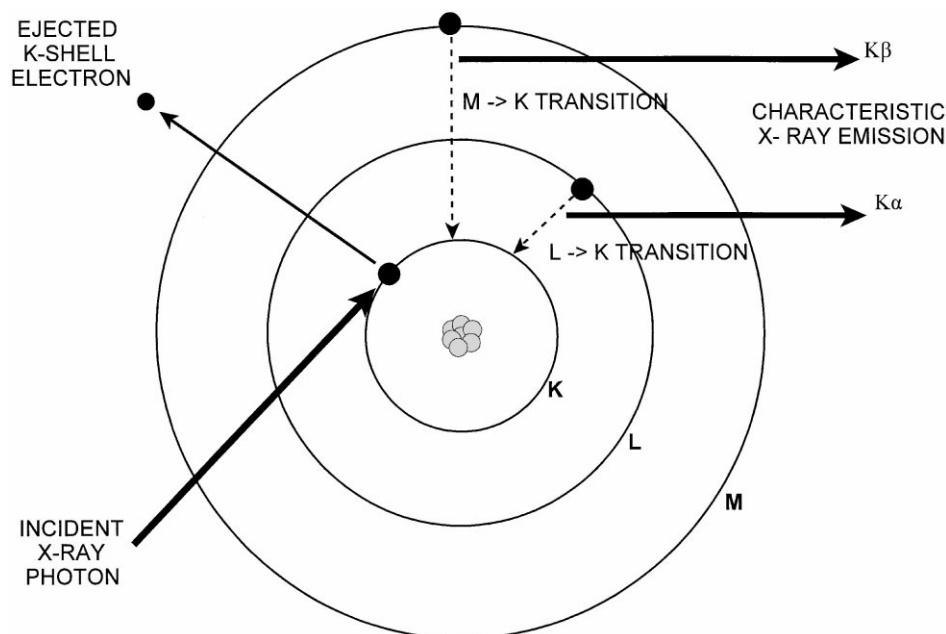


Fig. 1. Mechanism for X-ray fluorescence of an atom.

are characteristic of the atom, and provide qualitative identification of the element. The photon energy of a spectral line is the difference in energy, ΔE , between the initial and final levels involved in the electronic transition. Comparing the intensities of the X-rays from an unknown sample to those of suitable standards provides the basis for quantitative analysis of the element.

If the shell electron being replaced is a K-shell electron, then the X-ray emission is known as a K X-ray. Similarly, L-shell transitions produce L X-rays. X-ray spectral lines are grouped in series (K, L, M). All lines in a series result from electron transitions from various levels to the same shell. For example, transitions from the L- and M-shells to the K-shell provide spectral lines designated $K\alpha$ and $K\beta$, respectively. A spectrum of X-rays is generated by all the elements in the sample. Each element will have many characteristic lines in the spectrum, since a distinct X-ray will be emitted for each type of orbital transition.

3. FPXRF analyzers

Fig. 2 illustrates a block diagram of a typical XRF spectrometer. An excitation source (X-ray tube, radioisotope, etc.) is used to irradiate a sample which in turn fluoresces. The characteristic X-ray fluorescence is then detected and analyzed. The entire process is interfaced with a computer that provides general instrument control, data generation, and processing. Several different techniques may be used to induce fluorescence in a sample and to detect/analyze the characteristic X-rays given off by the sample.

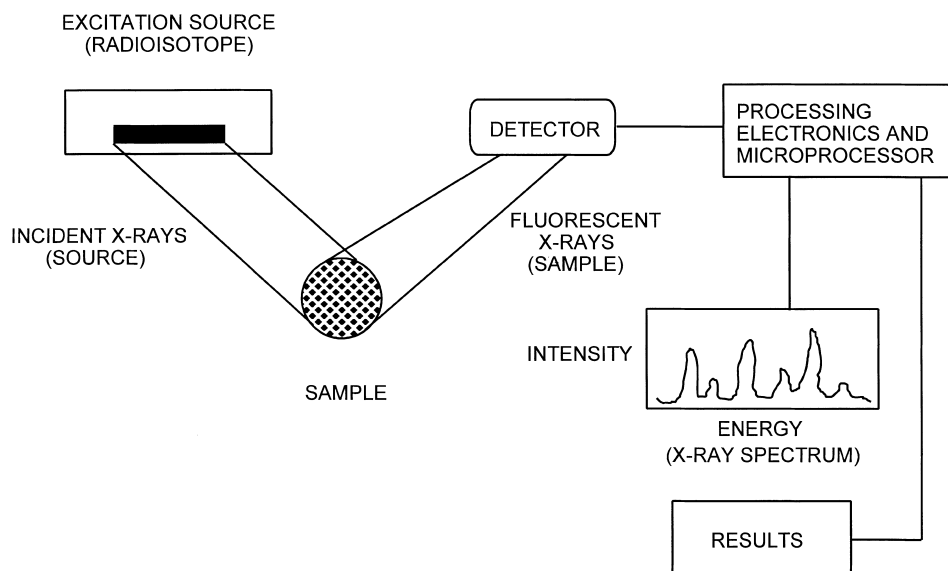


Fig. 2. Block diagram for a typical EDXRF spectrometer.

Table 1
Commonly used radioactive isotopes for XRF analysis

Isotope	Half-life	Useful radiation	Energy (keV)	X-rays excited efficiently
Fe-55	2.7 years	Mn K X-rays	5.9	Al–Cr
Co-57	270 days	Fe K X-rays	6.4	<Cf
		γ	14.4	
		γ	122	
		γ	136	
Cd-109	1.3 years	Ag K X-rays	22.2	Ca–Tc
		γ	88	W–U
Am-241	470 years	Np L X-rays	14–21	Sn–Tm
		γ	26	
Cm-244	17.8 years	γ	59.6	Ti–Se
		Pu L X-rays	14–22	

3.1. XRF sources

Various excitation sources may be used to irradiate a sample [1,3]. In a radioisotope source excited XRF analyzer, characteristic X-rays emitted from a sealed radioisotope source irradiate the sample. Alternately, an X-ray tube may be used to irradiate the sample with characteristic and continuum X-rays. Some of the original application studies reported in the literature for transportable XRF analyzers utilized X-ray tubes as sources [4,5]. Shortly thereafter, radioisotope source FPXRF analyzers were evaluated for environmental applications [6].

Table 1 lists radioisotope sources typically used in FPXRF analyzers. The most commonly used sources include Fe-55, Co-57, Cd-109, and Am-241. Each of these gives off radiation at specific energy levels and, therefore, efficiently excites elements within a specific atomic number range. As a result, no single radioisotope source is sufficient for exciting the entire range of elements of interest in environmental analysis, and many instruments use two or three sources to maximize element range. The half-life of a source is important, especially for Fe-55, Co-57, and Cd-109 sources. With half-lives as short as 270 days, some means (usually electronic) must be provided to compensate for the loss in source intensity over time. These sources may have to be replaced after a few years when their intensity decreases to a level too low to provide adequate sensitivity for the elements of concern.

Intensity in X-ray spectrometry is always given in “counts” per unit time, that is, X-ray photons per unit area per unit time. The unit area is usually the useful area of the detector, which is constant for all measurements and, therefore, is normally not included in the X-ray intensity unit.

3.2. Wavelength versus energy dispersion

XRF analyzers are usually classified by wavelength or energy dispersion for X-ray line detection and analysis. Wavelength dispersion involves the separation of X-ray lines on the

basis of their wavelengths, which may be accomplished with crystals (crystal dispersion), diffraction (diffraction dispersion), or spacial (geometric) dispersion. In energy dispersion, the separation of the X-ray lines is based on photon energies, and is accomplished by electronic dispersion with a pulse height analyzer. FPXRF analyzers typically employ energy dispersion for separation of X-ray lines. Wavelength is inversely proportional to energy and the conversion is [1,3], $E_{\text{ev}} = 12400/\lambda$, where E_{ev} is the energy in electron volts and λ is the wavelength in angstroms, Å.

3.3. Detectors

The X-ray detector converts the energies of the X-ray photons into voltage pulses that can be counted to provide a measurement of the total X-ray flux [2]. X-ray detectors are typically “proportional” devices where the energy of the incipient X-ray photon determines the size of the output voltage. Voltage discrimination via pulse height selection is used to select a narrow band of voltage pulses to pass to the scaling circuitry. A polychromatic beam of radiation incident upon the detector produces a spectrum of voltage pulses having a height distribution proportional to the energy distribution of the incident polychromatic beam. A multichannel analyzer is used to separate the spectrum of voltage pulses into narrow voltage bands for measurement of individual energies.

The three most common types of detectors are: the gas flow proportional detector, the scintillation detector, and the solid-state semiconductor detector. These detectors differ in resolution and analyte sensitivity. Resolution is the ability of the detector to separate X-rays of different energies, and is important for minimizing spectral interferences and overlap. Semiconductor detectors have the best resolution and are preferred for FPXRF instruments. These detectors may require liquid nitrogen as a coolant or employ electronic cooling.

3.4. FPXRF instrumentation

All FPXRF analyzers utilize the basic components illustrated in Fig. 2. Some configurations incorporate a measurement probe connected to an electronics unit via a flexible cable. The probe houses the detector and radioisotope source(s), while the electronics unit contains the microprocessor and data processing electronics. Typically, the probe weighs 3–5 lb and the electronics unit weighs 15–20 lb. Other FPXRF analyzers are contained in a single unit, and weigh less than 5 lb. Proper radiation shielding is provided by the manufacturer in accordance with applicable regulations governing manufacture and licensing of radioactive devices. The manufacturer also provides training in the safe and proper operation of the analyzer.

Table 2 lists representative FPXRF instrumentation. Some instruments provide dedicated element analysis (e.g. Pb in paint), while others provide a variety of elemental analyses depending on source and detector configuration. They generally are readily adaptable to field operations, though they may be limited by the power capacities of their batteries and the availability of liquid nitrogen. All provide a minimum of 8 h of field use with replacement of batteries.

Table 2
Representative field portable XRF instrumentation for environmental analysis^a

Manufacturer	Model number	Element range	Source	Detector	Utilities	Type
Spectrace	9000	S–U	(3) ISO: Cd-109, Fe-55, Am-241	HgI	Battery	P
	9000Pb	Pb	ISO: Cd-109	HgI	Battery	P
Metorex (Outokumpu)	HAZMET 940	K–U	(2) ISO: Cd-109, Am-241	SiLi (N ₂)	Battery	P
	XMET 880	Al–U	ISO	PC ^b	Battery	P
	XMET 920	Al–U	ISO	SiLi (N ₂)/PC	Battery/110 V	P/T
NITON	XL 309	Pb	ISO: Cd-109	SI PIN-diode	Battery	P
	XL 700 series	K–U	(2) ISO: Cd-109, Am-241	SI PIN-diode	Battery	P
RMD	Lead Paint Inspector	Pb	ISO: Co-57	Cd-telluride	Battery	P
SCITEC	MAP-3	Pb ^b	ISO	SiLi	Battery	P
PGT	XK-3	Pb	ISO: Co-57	PC	Battery	P

^a ISO = Isotope source (if isotope not listed, depends on probe configuration); PC = Proportional counter detector; SiLi and HgI = semiconductor detectors; SiLi (N₂) = liquid nitrogen cooled; SiLi (electric) = electrically cooled; P = portable; T = transportable.

^b May also be programmed for other selected elements.

4. Calibration and quantitation

The definition of “quantitative” XRF analysis depends, to a large extent, on the application and intended use for the data. For environmental applications, FPXRF results are quantitative when measurement precision is within 20%, and results are confirmed by an approved laboratory method [7]. Analysis of reference materials should produce results that are within $\pm 20\%$ of the certified values for target elements that have concentrations more than 10 times the FPXRF detection limit. While this definition is much less stringent than that for classical laboratory XRF analysis, it is a viable approach for most FPXRF environmental applications.

4.1. Factors affecting XRF calibration

Quantitative application of XRF methods for environmental applications requires calibration of the XRF analyzer using standards with known compositions [7,8]. The calibration procedure compares X-ray intensity for target elements to known concentrations in standards to develop a quantitation model suitable for analyzing a given type of sample (e.g. soils, liquids, thin films). A number of factors that may affect XRF response must be considered during the calibration process: (1) detector resolution and its relationship to spectral interferences; (2) sample matrix effects; (3) accuracy and suitability of calibration standards; (4) sample morphology (particle size, homogeneity, etc.), and (5) sample measurement geometry.

Proportional counter detectors typically have significantly poorer resolution than solid-state semiconductor devices and, therefore, are less able to resolve X-ray spectral overlaps. Therefore, it may be impossible to calibrate certain element combinations solely due to detector limitations, for example, interfering K X-ray lines from neighboring elements. Furthermore, some X-ray line overlaps are so severe that even the best resolution obtained for semiconductor detectors on FPXRF systems is insufficient to separate them (e.g. As K/Pb L), and residual error may persist in the spectral deconvolution techniques used to obtain net intensities for XRF calibration purposes.

Matrix effects arise from the impact that variations in concentrations of interfering elements have on the measured X-ray intensity of the target element. These effects produce non-linear intensity response versus target element concentration, and they appear as either X-ray absorption or enhancement phenomena. Most FPXRF analyzers provide means to correct for these effects when the application is calibrated. The severity of matrix effects and calibration method employed generally dictate the number of standards required to calibrate an application.

The standards selected to calibrate XRF applications must have accurately known concentrations for the target elements. The accuracy of the standards ultimately defines the best accuracy that can be expected for the XRF calibration model, and the measurement times necessary to achieve it. Calibration standards must also be representative of the matrix and target element concentrations that are to be analyzed. Sample morphology (particle size distribution, uniformity, heterogeneity, and surface condition) must be considered when calibrating environmental XRF applications. Standards should exhibit the same characteristics as the samples to be analyzed to produce a reliable calibration model. Sample placement

Table 3
Comparison of XRF calibration methods

Empirical calibration	Fundamental parameters calibration
Site samples must be collected for use as standards and must be certified by independent laboratory methods	Must know or estimate 100% of sample composition including unmeasured balance
High costs associated with collection and analysis of site samples and significant time to receive data back from the laboratory	Pure elements and/or readily available certified reference materials may be used as standards
XRF must be calibrated with site-specific standards prior to project initiation	No site-specific calibration is required; should be applicable to any site with same sample type
A large number of standards may be required to model and correct for matrix effects	All elements are included in the FP quantitation algorithm; concentrations in standards need not bracket the levels at the site
Results based on a good calibration model will be accurate and directly comparable to laboratory analysis	FP model may require initial “fine-tuning” using certified reference materials

is a potential source of error, since the X-ray signal is sensitive to measurement geometry and decreases as the distance from the excitation source increases. This error is minimized by maintaining the same source/sample geometry for all calibration standard and sample measurements.

4.2. Calibration methods

There are two major approaches for calibrating FPXRF applications. The empirical approach relies on a suite of site (or “typical”) standards and regression mathematics to generate a site-specific calibration for elemental response and matrix effects. The fundamental parameters (FP) approach utilizes X-ray theory to mathematically pre-determine interelement matrix effects combined with pure element or known standard intensity responses to develop a quantitative algorithm for a specific sample type. FP methods provide multi-site capabilities by eliminating the requirement for site-specific standards. A comparison of site-specific and FP calibration methods is given in Table 3.

4.2.1. Empirical calibrations

Empirical calibrations are typically based on a set of previously collected site-specific calibration standards (SSCS) that have been analyzed by reliable independent laboratory methods [8–10]. They must be representative of the matrix and target element concentration ranges at the site. Standards must bracket the full range of target element and interfering matrix element concentrations, and must reflect variations in element ratios to produce a representative calibration model. The highest and lowest concentrations in the SSCS set define the calibration range. Samples used to generate the calibration must be prepared in the same way as samples that will be analyzed at the site. The SSCS set should include several samples with concentrations near the critical concentration of concern, i.e. the action level, to improve the accuracy of the empirical calibration model. The greater the knowledge about the sample matrix (how it varies at the site), the more representative the calibration model is and, therefore, the more accurate the results.

Typical models used for empirical calibration are described elsewhere [3,9,10]. A minimum of 5–10 samples are needed to generate a simple linear model for a single analyte when interelement matrix effects are not significant. As the number of elements analyzed increases, more calibration samples are required to adequately characterize target element concentration ranges and correct for interelement matrix effects. For some applications, it may be necessary to produce more than one calibration model to maintain linearity over the concentration ranges in question. If the sample matrix varies significantly, a calibration model should be generated for each matrix type present at the site to provide better characterization.

In some cases, taking out the ratio of the analyte intensity to the scattered X-rays from the source (backscatter) may be useful to correct for matrix effects, because backscatter intensity is proportional to the average composition of the sample. The ratio technique may also be useful for generating non-site-specific empirical models provided a sufficient number of standards “typical” of the sample matrix are available. For example, analysis of metal contaminants in soils where backscatter may provide information on the average composition of the soil sample.

4.2.2. *Fundamental parameters calibrations*

FP techniques have been understood and commonly utilized on laboratory XRF systems for many years to analyze a wide variety of materials [1–3,11,12]. Historically, FPXRF instruments that have been used for environmental applications have relied upon site-specific calibration methods that have not been useful for more than one site and/or sample matrix. With the availability of field portable computing power, the FP approach is valid for FPXRF analyzers and provides multi-site capabilities by eliminating the requirement for site-specific standards. However, uncertainties in the data used to generate theoretical coefficients may lead to errors and biases in FP analytical models based on them. Therefore, adjustments based on certified reference materials may be necessary to produce reliable results. The resultant application is, in principle, suitable for analysis of target elements for a given sample type (soil, water, oil, thin films, etc.) at any site.

The FP approach utilizes theory to pre-determine interelement coefficients rather than empirical methods that require matrix specific calibration standards (see Table 3). Background and overlap corrected net intensities are converted into concentrations by an appropriate FP algorithm. For accurate results with FP, the entire sample composition must be known. Many elements found in environmental samples (e.g. C, O, N, Si) cannot be measured with field-portable XRF instruments, therefore, assumptions must be made about the unmeasured balance of the sample. In some cases, the composition of the unmeasured balance is well defined, and can be included as part of the FP calculation. Furthermore, it may also be possible to determine the average composition of the unmeasured balance based on backscatter X-rays from the radioisotope source used for sample excitation. The lower the average atomic number of the sample, the higher the intensity of the incoherently scattered peak (Compton peak). This also applies to a lesser degree to the coherently scattered peak (Raleigh peak). The ratio of these two peaks (Compton/Raleigh) is proportional to the average atomic number and, therefore, the average composition of the sample.

Several criteria must be met to successfully apply FP techniques in XRF analyses [13]: (1) all significant sample elements must be considered; (2) 100% of the sample

composition (measured plus unmeasured balance) must be known to theoretically calculate FP coefficients; (3) the typical composition of the sample including the unmeasured balance must be known; (4) overlap spectra and pure (100%) intensities for all measured elements are required, and (5) the final FP model must be verified and optimized as necessary using certified standards of the same matrix type as the samples to be analyzed. Furthermore, since XRF measures total concentrations of the elements of interest, the standards used to optimize FP models should be certified based on total elemental analysis. Because 100% of the sample composition must be considered in the FP calibration approach, different models need to be used for samples/matrices with major differences in the non-XRF elements (unmeasured balance). Therefore, a model for soils and sediment may not be applicable for sludge and industrial waste.

FP algorithms may be applied in a rigorous fashion or as “alpha coefficients” models [8,13]. The rigorous approach is generally used for laboratory XRF analyzers to provide analysis capabilities for a wide variety of sample types. The alpha coefficients approach is better suited to FPXRF analyzers, where the FP coefficients (for a specific sample type) are pre-determined using an external PC, and then downloaded into the FPXRF analyzer memory.

The main benefit of using FP techniques is that as little as one standard is required to calibrate the XRF system for quantitative analysis. On the other hand, the entire composition (100%) of the standard(s) must be known or accurately estimated to successfully calibrate the FP algorithm. Other advantages include: (1) no site-specific calibration is required; (2) minimal operator training is required; (3) all relevant elements are included in the concentration calculation, and (4) the FP model is applicable to any site (not site-specific) for a given sample type (e.g. soils).

4.2.3. *Thin sample calibrations*

Laboratory XRF systems have been used for many years to analyze environmental thin-specimen samples [14]. The use of portable XRF analyzers for screening air monitoring filters has been reported [15]. Calibrating XRF analyzers for thin sample applications (e.g. particulates on filters, dust on wipes, lead in paint, etc.) is generally a less difficult task than that for bulk samples. This is because interelement matrix effects are negligible for all but the lowest energy X-ray lines (i.e. less than 5 keV), therefore, a linear relationship exists between the fluorescent intensity of the element in the film and the mass per unit area of that element [16,17]. The XRF calibration is typically accomplished using empirical methods and standards with known mass loading (mass per unit area). However, FP approaches have also been used. Problems associated with thin sample analyses include self-absorption in particles with low energy X-ray lines (particle size effects) and substrate interference effects. Both of these effects require application of empirical or theoretical correction factors in addition to the linear response models based on thin sample calibration standards.

Portable XRF lead-based paint analyzers have typically been pre-calibrated by the manufacturer using certified lead-in-paint standards. The XRF measurement is susceptible to variable scattering of the source X-rays from the substrate material beneath the paint layers. Most lead-in-paint XRF analyzers provide corrections for substrate scattering; however, the corrections may not be effective in all cases. Furthermore, depending on which lead X-ray

line is measured (K-shell or L-shell), the analysis may be affected by the paint matrix and the number of overlying and underlying (wallbase) layers.

Thin sample calibration standards for metals on filter media and lead-in-paint are available from NIST [18]. Lead film standards are also commercially available [19].

5. Detection limits

Detection limits (DLs) for XRF analysis are both element and matrix dependent, and most elements are detectable below typical site action levels. XRF DLs are dependent on analysis time; longer analysis times provide lower DLs. While XRF is a relatively fast technique, the longer analysis times required for improved DLs impact the total number of samples analyzed during a specific time period.

5.1. Calculation of detection limits

Several methods may be used for the determination of the detection limit (DL) for EDXRF analysis. A widely accepted method states that the DL is “that amount of analyte that gives a net line intensity equal to three times the square root of the net background intensity for a specified counting time, or in statistical terms, that amount that gives a net intensity equal to three times the standard counting error of the background intensity” [1,20]. This definition can be expressed as

$$\text{MDA} = \left(\frac{3}{m} \right) \left(\frac{I_B}{T_B} \right)^{1/2} \quad (1)$$

where, MDA is minimum detectable amount, I_B the background count rate (counts/s), T_B the background count time (s), and m the sensitivity (net counts/s per unit concentration). Detection capabilities improve (decrease) as counting time increases, as background decreases, and as sensitivity increases. The DL may also be defined in terms of the precision of repeat measurements on a standard sample. Once an analyzer has been calibrated, intensity is converted to concentration, and variations in X-ray intensity and all other error parameters are reflected in the variation of the concentration. The US EPA [21] recommends that the DL be determined by the measurement of a sample that has a concentration of analyte close to the expected DL. The standard deviation of non-consecutive replicate measurements multiplied by the rounded Student's t -factor is the recommended estimation of the method detection limit (MDL)

$$\text{MDL} = 3\sigma \quad (2)$$

where σ is the standard deviation for the replicates, and the Student's t -factor is approximately equal to three. This method provides a realistic DL value, because all parameters (e.g. time, sample handling errors, etc.) that affect the measurement are included.

Table 4
Comparison of DLs (mg/kg) in relationship to measuring times

Element	Measuring time (s)						Average concentration ^a
	15	30	60	120	240	480	
K	1573	1402	745	667	285	362	14278
Ca	1369	882	681	500	265	211	21187
Ti	630	574	445	321	129	120	4155
CrLO ^b	465	252	173	151	117	53	−56 ^c
CrHI ^b	817	516	562	348	137	188	29
Mn	1217	757	756	248	313	225	634
Co	705	567	555	406	252	274	243
Ni	211	140	121	73	84	49	18
Cu	187	148	83	69	32	17	17
Zn	160	120	46	42	45	32	119
As	94	42	52	30	36	17	17
Se	95	25	34	26	12	6	−15 ^c
Sr	104	41	34	34	18	15	351
Zr	54	45	22	14	10	7	196
Mo	14	9	7	6	3	2	3
Hg	95	92	77	56	23	17	−21 ^c
Pb	61	41	42	22	12	11	26
Rb	52	32	18	14	9	6	51
Cd	319	242	105	88	93	46	55
Sn	139	138	52	59	39	36	−13 ^c
Sb	109	90	47	39	29	17	−2 ^c
Ba	87	45	36	30	22	16	336
Fe	2851	2929	2072	1461	855	459	35848

^a Determined by the average of the twelve 480 s measurements (mg/kg).

^b CrLO and CrHI relate to the determination of Cr using the Cd-109 and Fe-55 sources, respectively.

^c Negative values for elements with concentrations below the DL are provided for information purposes only; they do not affect MDL calculations.

5.2. Detection limit versus analysis time

Table 4 illustrates the dependence of the MDL on analysis time for a representative sample. These results were obtained on a portable EDXRF analyzer using three radioisotope sources and a HgI₂ semiconductor detector. Similar results may be obtained for other XRF instruments. Minimum DLs obtained for each analyte by analyzing the sample 12 times at 15, 30, 60, 120, 240, and 480 s are listed in the table. The DL is defined as three times the standard deviation of the 12 measurements. Generally, the MDL decreases with increased analysis time; however, experimental error may lead to deviations from the expected behavior. Average concentrations reported in the table are calculated from the raw data obtained in the study. Therefore, concentration values below the MDL (including negative values) are reported for information purposes only. DLs are affected by the concentration of the analyte in the sample. Analytes at high concentrations tend to have higher apparent DLs than those at lower concentrations. This highlights the necessity to use a sample with analyte concentrations as close to the MDL as possible.

Table 5
Certified composition, NIST SRM 2709: SAN JOAQUIN soil

Element	Composition (wt.%)	Element	Composition (µg/g)
Aluminum	7.50	Antimony	7.9
Calcium	1.89	Arsenic	17.7
Iron	3.50	Barium	968
Magnesium	1.51	Cadmium	0.38
Phosphorus	0.062	Chromium	130
Potassium	2.03	Cobalt	13.4
Silicon	29.66	Copper	34.6
Sodium	1.16	Lead	18.9
Sulfur	0.089	Manganese	538
Titanium	0.342	Mercury	1.40
		Nickel	88
		Selenium	1.57
		Silver	0.41
		Strontium	231
		Thallium	0.74
		Vanadium	112
		Zinc	106

While Table 4 details the DLs for a specific FPXRF analyzer, it is more appropriate to determine the DL for a specific project. Such a DL reflects instrument variability and other sources of error for the set of samples analyzed. Note also that the data in Table 4 was obtained by analyzing the standard 12 times consecutively, thus the DLs are “short-term” data. Actual site data tends to yield DLs that are somewhat larger, reflecting instrument performance over several days or weeks when a soil “standard” is analyzed periodically during field analysis. The standard deviation for the repeat non-consecutive analyses is used to estimate the DL for the analytes of concern.

The choice of an appropriate sample to use for determining actual site DLs requires some trade-offs. The use of a site background sample should match well with site soils in terms of general composition, particle size distribution, and moisture content. Typically, site background soils may be used for the determination of MDLs with good success. However, obtaining a representative background sample is often difficult. Therefore, to standardize the MDL determination, a certified standard soil, NIST 2709, available from the NIST, could be used to determine an estimate for the DL. Table 5 lists the composition of this soil as certified by NIST. Most elements of interest for hazardous waste sites are present at trace levels, making this a useful standard for DL studies. The NIST 2709 sample has been prepared to a finer particle size than is common for most site samples. Therefore, it may provide concentrations by FPXRF analysis that are different than expected due to particle size effects. Several other soil standards, including NIST 2710 and 2711, may be used to determine the accuracy and precision of the analysis at concentrations close to the action levels appropriate for site investigations.

5.3. FPXRF analysis of reference materials

Typically, the elements of interest depend on the environmental application in question. Once the target elements are defined, suitable reference materials are selected for calibrating the FPXRF analyzer (if empirical calibration is required), for determining FPXRF DLs, and for determining accuracy and precision. Standard reference materials (from NIST and other sources) may be used for some applications (e.g. analysis of soils). Site specific calibration standards (analyzed by laboratory methods) may be required when certified materials are not available for the matrix in question. Depending on site action level requirements, FPXRF analysis may not be suitable for some elements due to high DLs, unresolved spectral and matrix interferences, and other instrument limitations.

Tables 6 and 7 show typical FPXRF results for NIST soil standards (numbers 2710 and 2711). The FPXRF analyzer utilized three radioisotope sources, a HgI₂ semiconductor detector, and two different FP calibration models. Results were based on the average of 10 measurements with 60 s acquisition time per source. A number of elements were below the FPXRF MDL. Typically, FPXRF results from the “standard” FP application (Table 6) agreed within 20% of certified values for elements with concentrations significantly above (more than 10 times) the MDL. Spectral interferences made some elemental analyses difficult; the high Fe content produced high background for Mn and Co, and Pb severely interfered with As determination. Additionally, Ba results were approximately 30% below certified values. The “standard” application had been adjusted to compare to digestion/lab analysis of coarse soils. The “fine particle” application was adjusted to reflect total analyte concentrations in samples such as SRMs. This application (Table 7) was generally in better agreement with certified values for all measurable elements in the SRMs. The data in this table illustrates the usefulness and accuracy of FPXRF for analysis of soil contaminants, and demonstrates the need to adjust FP-based calibrations with certified materials. Furthermore, the data illustrates the need to adjust measurement times to obtain MDLs compatible with hazardous waste site objectives.

6. Sampling

Regardless of the instrumentation employed, there are two methods of sample preparation that should be considered when analyzing soil samples by FPXRF: in situ and discrete sampling [7,22–24]. Typically, both methods are employed based on the number of analyses required, site/contaminant history, time allocated to conduct site activities, and proposed sampling design. For direct analysis of contaminated soils (in situ), the XRF instrument may be taken to the sample location and the probe placed directly on the soil surface to measure heavy metal contamination. In situ analysis provides much more flexibility when using a FPXRF unit by allowing rapid collection of data for a large number of sample points, eliminating physical sampling and chain of custody considerations, and yielding real-time data that can be used for rapid decisions in the field.

In the case of discrete sampling (physically removing a sample), significantly more preparation time is required. This limits the number of measurements that can be performed in the time allocated for site activities. The payback for this effort is that analytical accuracy and

Table 6
Analysis of NIST soil SRMs with a FPXRF analyzer standard application^a

Element	MDL ^b	SRM 2710		SRM 2711	
		Certified	FPXRF ^c	Certified	FPXRF ^c
K	–	21100	25600	24500	28900
Ca	–	12500	13700	28800	34900
Ti	–	2830	2800	3060	2920
CrLO ^d	295	(39) ^e	ND	(47) ^e	ND
CrHI ^d	743	(39) ^e	ND	(47) ^e	ND
Mn ^f	1010	10100	12800	638	ND
Fe	–	33800	32300	28900	25700
Co ^f	1160	(10) ^e	ND	(10) ^e	ND
Ni	350	14	ND	21	ND
Cu	137	2950	2740	114	ND
Zn	204	6952	6080	350	293
As	134	626	231 ^g	105	ND ^g
Se	59	NA	ND	1.5	ND
Sr	72	(240) ^e	387	245	294
Zr	44	NA	153	(230) ^e	320
Mo	13	(19) ^e	26	(1.6) ^e	ND
Hg	150	33	ND	(6.3) ^e	ND
Pb	66	5532	4920	1162	1050
Rb	79	(120) ^e	154	(110) ^e	122
Cd	110	22	ND	42	ND
Sn	67	NA	ND	NA	ND
Sb	52	38	ND	19	ND
Ba	58	707	425	726	476
Ag	85	35	ND	4.6	ND

^a All concentrations in mg/kg; three sources: Cd-109, Fe-55, Am-241; 60 s acquisition time per source; fundamental parameters calibration (“standard” soils); MDL: method detection limit; ND: not detected (less than the MDL); NA: not available.

^b MDL determined using NIST SRM 2709.

^c FPXRF results are average of 10 analyses.

^d CrLO: Cr results with Fe-55 source; CrHI: Cr results with Cd-109 source.

^e Parentheses indicate that the value is not certified but provided for information purposes only.

^f High MDLs for Mn and Co due to high background contribution from Fe X-ray line.

^g Pb interferes with As measurement (Pb concentration is 9–11 times that of As).

precision are generally improved for prepared samples compared to in situ measurements. Site data quality objectives (DQO) determine which sample preparation method is most appropriate [25,26]. Typical procedures for in situ and discrete sample measurements are discussed elsewhere [27].

6.1. Representative samples

To accurately characterize site conditions, samples collected must be representative of the site or area under investigation [28]. Representative soil sampling ensures that a sample or group of samples accurately reflects the concentration of the contaminant(s) of concern at a

Table 7
Analysis of NIST soil SRMs with a FPXRF analyzer fine particle application^a

Element	MDL ^b	SRM 2710		SRM 2711	
		Certified	FPXRF ^c	Certified	FPXRF ^c
K	–	21100	21400	24500	24400
Ca	–	12500	11700	28800	30000
Ti	–	2830	2800	3060	2970
CrLO ^d	266	(39) ^e	ND	(47) ^e	ND
CrHI ^d	993	(39) ^e	ND	(47) ^e	ND
Mn ^f	787	10100	9490	638	890
Fe	–	33800	33400	28900	27400
Co ^f	747	(10) ^e	ND	(10) ^e	ND
Ni	233	14	ND	21	ND
Cu	113	2950	2700	114	ND
Zn	126	6952	6530	350	391
As	79	626	463 ^g	105	ND ^g
Se	60	NA	ND	1.5	ND
Sr	37	(240) ^e	401	245	298
Zr	59	NA	161	(230) ^e	320
Mo	12	(19) ^e	18	(1.6) ^e	ND
Hg	131	33	ND	(6.3) ^e	ND
Pb	96	5532	5680	1162	1230
Rb	43	(120) ^e	158	(110) ^e	129
Cd	145	22	ND	42	ND
Sn	81	NA	ND	NA	ND
Sb	65	38	ND	19	ND
Ba	111	707	727	726	778
Ag	83	35	104	4.6	ND

^a All concentrations in mg/kg; three sources: Cd-109, Fe-55, Am-241; 60 s acquisition time per source; fundamental parameters calibration ("fine particle" soils); MDL: method detection limit; ND: not detected (less than the MDL); NA: not available.

^b MDL determined using NIST SRM 2709.

^c FPXRF results are average of 10 analyses.

^d CrLO: Cr results with Fe-55 source; CrHI: Cr results with Cd-109 source.

^e Parentheses indicate that the value is not certified but provided for information purposes only.

^f High MDLs for Mn and Co due to high background contribution from Fe X-ray line.

^g Pb interferes with As measurement (Pb concentration is 9–11 times that of As).

given time and location. Analytical results from representative samples reflect the variation in contaminant presence and concentration range throughout a site. Parameters affecting representative sampling include: (1) geologic variability, (2) contaminant concentration variability, (3) collection and preparation variability, and (4) analytical variability.

6.2. Sample moisture

If measurement of soils or sediments is intended, the sample moisture content affects the accuracy of the analysis. Sample dilution tends to decrease the apparent concentration

as the moisture level increases. This effect is most severe for analytes with low energy X-ray lines (less than 5 keV), and may be negligible for elements with higher energy X-ray lines (for example, Pb). To some extent, the dilution effect may be counteracted by the reduced matrix absorption for the analyte X-ray lines when water replaces the higher atomic number (and, therefore, more absorbing) soil/sediment matrix. The direction and magnitude of the bias introduced by moisture is, therefore, dependent on the analyte X-ray line energy and the composition of the sample. The overall error may be minor when the moisture content is small (5–20%), but it may be a major source of error when the soil is saturated with water [29]. Soil/sediment samples should be dried when moisture content is greater than 20%.

6.3. Sample placement and probe geometry

Sample placement is a potential source of error, since the X-ray signal decreases as the distance from the radioactive source increases. This error can be minimized by maintaining the same source to sample distance for all measurements. When performing in situ measurements, the probe surface should be parallel to the sample surface, which must be flat. The goal is to place a flat compacted soil surface against the probe's sample presentation plane, achieving maximum surface to surface contact between the sample and probe. Variations in measurement geometry may cause X-ray signal attenuation and, consequently, erroneous results.

6.4. Physical matrix effects

Physical matrix effects (due to sample morphology) are the result of variations in the physical character of the sample, and include parameters such as particle size, uniformity, heterogeneity, and surface condition [7]. These parameters vary depending on the conditions present at each site, and must be monitored closely to determine if they bias the FPXRF results. When prepared soil/sediment samples are stored in XRF cups, settling effects may also bias results. If the cups are stored window film side down, the finer particles tend to settle against the window, and XRF results may be biased high for the elements in those particles. Conversely, XRF results may be biased high for elements in larger particles if the cups are stored window film side up. To minimize these effects, the cups should be shaken and tapped on a flat surface to pack the sample against the window film prior to XRF analysis.

6.5. Depth of X-ray penetration

XRF analysis of soils is a surface analytical technique regardless of the X-ray source and instrumentation involved. The maximum depth of X-ray penetration using sealed radioisotope sources is approximately 2 mm in a soil matrix, therefore, as little as 5 mm of clean material can mask contaminated soil. For FPXRF analysis, this means that more than 5 mm of soil is considered to be infinitely thick (the depth at which 99% of the analyte X-rays have been generated). In situ soil measurements are always infinitely thick. However, when

analyzing soil in sample cups, the material must nearly fill the XRF sample cup (at least three-quarters full) to ensure that the sample is effectively infinitely thick.

6.6. Effects of sample containers

The composition and thickness of materials located between the sample and probe window affects absorption of light element X-ray lines, which in turn affects results from FP-based instruments [30]. Measurements made with XRF sample cups should employ 0.2-mil Mylar or polypropylene X-ray film, which has negligible attenuation effects for most contaminant element X-ray lines and is of uniform thickness and composition. If plastic bags are used to collect and measure soil/sediment samples, the XRF analyzer must have been calibrated using the same thickness plastic to minimize these effects. In the case of instruments using FP-based calibrations, only a thin layer of 0.2-mil Mylar or polypropylene should be used to protect the probe from cross-contamination.

7. QA/QC and data interpretation

7.1. Quality assurance objectives and XRF

For each data collection activity established at a hazardous waste site, a quality assurance (QA) objective must be specified that corresponds to the ultimate data use objective. The US EPA has defined three objectives (QA1, QA2, and QA3) for assessing and substantiating data collection [25]. The characteristics of each QA objective should be evaluated to determine which one or combination fits the data use objective(s) established for the site.

QA1 is a screening objective used to afford a quick, preliminary assessment of site contamination, and is suitable for data collection activities that involve rapid, non-rigorous methods of analysis and QA. QA2 is a verification objective used to verify screened data (field or laboratory) or data generated by any method that satisfies the QA2 requirements. A minimum of 10% verification of results is required. This objective is suitable for data collection activities that require qualitative and/or quantitative verification of all or a select portion (10% or more) of the data. QA2 is intended to give a level of confidence for a select portion of the preliminary data. QA3 is a definitive objective used to assess the accuracy of the concentration level as well as the identity of the analyte of interest. It is suitable for data collection activities that require a high degree of both qualitative and quantitative accuracy. Rigorous analytical methods and quality assurance are conducted to give a high level of confidence in the quantitative results for “critical samples”.

XRF measurements can fit into QA1 or QA2 objectives. If the site objectives are characterization or determination of the relative magnitude of contamination, XRF measurements fit the QA1 objective. If verification of the extent of contamination or verification of cleanup effectiveness is required, QA2 objectives may be attained by submitting a minimum of 10% of the samples for confirmation analysis by a US EPA-approved laboratory method (such as atomic absorption (AA) or inductively coupled plasma (ICP) analysis). XRF is rarely used in conjunction with the QA3 objective, due to the increase in time and laboratory costs associated with this objective.

7.2. QA/QC considerations

Depending on the particular XRF instrument employed, various types of QC samples are required to ensure data integrity. In some instances, the rate of QC samples is dependent on the data quality objective established for the site. In all cases, measurements of field QC samples or calibration check measurements should be recorded as a part of the permanent site record.

7.2.1. Precision

Precision is determined by repeat non-consecutive measurements of a sample at or near the action level or level of concern established for the site [7,31]. This sample should be analyzed before any site samples are measured, after every tenth sample or sampling location, and after site activities are completed. The sample should be measured a minimum of eight times, the individual results reported, and the average, standard deviation, and percent relative standard deviation (% R.S.D.) calculated. A critical feature of this QC sample is that it be at or near the site action level to be most beneficial. The precision objective for FPXRF measurements should be $\pm 20\%$ R.S.D. [7]. Determining precision near the action level can be extremely important if the XRF results are to be used in an enforcement action. A site-specific sample that has been analyzed by approved laboratory methods can be used for precision measurements. Alternatively, a standard reference material (SRM) may be employed.

7.2.2. Accuracy

Instrument performance should be monitored while field measurements are made [7,22,32]. Instrument checks (energy calibration, detector resolution, etc.) can be used to monitor instrument stability. Characterized samples at mid-calibration range or several times the action level should be measured to determine calibration performance for the site target elements. For site-specific calibrations, several sets of check samples may be required due to site matrix differences. For FP quantitation models, check samples may be either well characterized site samples or soil SRMs. Instrument stability checks should be done at the beginning of the day prior to site measurements. Calibration performance check samples should be analyzed at the beginning of the day and after every 10 sample locations.

7.2.3. Comparability

To determine field data quality, XRF results are generally compared to laboratory data obtained using a sample digestion procedure. XRF data that correlate directly to laboratory data are considered comparable to the digestion/analysis methods used. For site-specific XRF calibrations, SSCS that have been analyzed by a laboratory method are required to calibrate the instrument. Once properly calibrated, the XRF instrument produces results that would be similar to those obtained by the laboratory method. Significant variance has been reported for extraction recovery of different metals in different soil matrices when several laboratories used identical EPA-approved digestion methods [33]. Therefore, comparison of XRF data to laboratory data may be highly dependent upon the sample matrix, the digestion/extraction methodology, and the laboratory analyzing the samples.

Another issue of comparability arises when multiple XRF units are on site at the same time [32]. In this case, check samples from the same sample source/lot must be measured on all XRF units to establish comparability of results from the different analyzers. These may be well characterized site samples or SRMs that contain the target elements at concentrations near their respective action levels.

7.2.4. Replicate samples

Two types of replicate sample measurements should be considered when performing FPXRF analysis. For extent of contamination (EOC) studies or site assessments, field duplicates are recommended at a minimum rate of 5%. Duplicate samples should be prepared independently of other samples using the same sample preparation procedure. Field duplicates provide a check on variability (heterogeneity) of the sample matrix, consistency of sample preparation, and precision of the analysis, and should be within $\pm 20\%$ [7]. If FPXRF analysis is utilized as part of a cleanup verification objective, then eight replicate samples from one location may be employed for analytical error determination [25]. This error determination procedure is optional, but when employed generates information about the confidence level that can be associated with the sampling method or sample preparation method.

7.2.5. Confirmation samples

Accuracy, relative to a specific digestion method and elemental analysis procedure, is best determined by using site-specific, low-, mid-, and high-level samples that have been analyzed by laboratory methods. For a total accuracy check, confirmation samples should be collected throughout the entire sampling effort (minimum 10% with a number of samples at or near the critical level). The results of laboratory analysis (dependent) and XRF analysis (independent) are evaluated with regression analysis. The coefficient of determination (r^2), for the element of interest, should be 0.7 or greater to satisfy QA2 DQO [7].

Based on the QA objectives established for the site, confirmation samples may or may not be utilized to achieve site goals. If QA1 objectives have been established for the site, there is no requirement to collect and analyze confirmation samples. However, confirmation samples may still be collected to verify that the XRF instrument is producing reliable results. The percentage of confirmation samples required is determined on a site-specific basis. If QA2 objectives have been established for the site, then confirmation samples are required [7]. Ideally, the sample that was analyzed by XRF should be the same sample that is submitted for laboratory analysis. For in situ analyses, a single sample should be collected for both XRF measurement (in an XRF sample cup) and confirmation analysis. If sample splits are employed to prepare confirmation samples, care must be exercised to ensure that the XRF and laboratory instruments “see” the same sample matrix. The entire sample lot must be carefully prepared and blended prior to the split, and all samples must be prepared in the same way (splits as well as ordinary samples).

7.2.6. Standard reference materials

Three soil SRMs (2709, 2710, 2711) are available from the National Institute of Standards and Technology [18]. Each was developed and certified for more than 25 elements.

Additionally, two sediment SRMs (1646 and 2704) are available. The National Research Council Canada, Institute for Environmental Chemistry [34] provides three marine sediment reference materials for trace elements (MESS-1, BCSS-1, PACS-1) that could be useful as PE and DL standards. Purified acid-washed sand is available from several commercial vendors, and may be used to provide a zero concentration (clean matrix) sample.

7.2.7. Field reporting of XRF data

Generally, XRF instruments calculate and may report results to a higher degree of significance than is warranted by their measurement precision and calibration accuracy. FPXRF analyzers are typically accurate to two or three significant figures. For final reports, and comparison to laboratory analysis of calibration and confirmation samples, FPXRF results should typically be rounded to two significant figures.

7.2.8. Method detection limits

Measurement times should be adjusted so that XRF DLs are well below site action levels whenever possible. For empirical calibrations, a site-specific background sample that has low concentrations for the elements of interest should be used to determine the XRF MDLs for the site. For FP-based calibrations, SRMs may be utilized to determine site MDLs. The MDL sample should be measured at the beginning of site activities, after every tenth sample or sampling location, and at the end of site activity.

7.3. Interpretation of data

7.3.1. Evaluating confirmation sample data

When evaluating XRF results, graphical and statistical analyses should be used to ensure that the data accurately characterizes the site [32,35,36]. Verification or confirmatory samples taken from the data set are used in this evaluation process. There are two possible options: (1) random selection of the samples, and (2) subjective selection of low-, mid-, and high-concentration samples to ensure a wide range of values. If an appropriate number of confirmatory samples are taken, the random selection process should be representative of the entire range of concentrations being sampled, making subjective selection unnecessary. An initial set of random samples should be chosen for statistical analyses, and if necessary, followed by subjective selection of additional samples to provide a wide range of concentration values. A number of confirmation samples should be from site locations with contaminant concentrations at or near the action level.

7.3.2. Values below the detection limit

Values below the XRF DL pose a problem with most statistical analyses, and they should be used with caution due to the bias that they can introduce. Several methods may be utilized to handle these values [35]: (1) all data points should be used unless otherwise proven that they are anomalies or errors; (2) if a large number of XRF values are below the DL, laboratory results should be used to verify them; (3) if a low percentage of these values occurs, statistical analyses should be run with and without such values to determine their influence, and (4) depending on the instrumentation, either zero, half the DL, or the

DL may be substituted for values below the XRF DL. In general, statistical analyses should not be performed with fewer than eight data points.

7.3.3. *Statistical analysis*

Several statistical analysis methods may be used to evaluate and compare XRF and confirmatory data [27,32]. The minimum statistical treatment that should be done for confirmation samples is regression analysis to evaluate if a linear relationship exists between the independent variable (XRF data) and the dependent variable (confirmatory laboratory data). Regression results should be plotted as a visual aid to determine the significance of the linear model and to identify potential outliers.

7.3.4. *Correlation analysis*

Correlation analysis is related to regression analysis. It determines the degree of linearity between two sets of data, and may be utilized prior to linear regression analysis. A correlation coefficient (R) is generated in the analysis, and ranges in value from -1.0 (a perfect negative linear correlation) to 1.0 (a perfect positive linear relationship). A zero value indicates no linear relationship exists. If a strong linear relationship exists, linear regression analysis should be used to evaluate the data sets. If non-linear relationship exists, a non-linear regression analysis may be considered.

7.3.5. *Regression analysis*

Regression analysis [36] is used to fit a model between an independent variable and a dependent variable to determine if a linear relationship exists between the variables and if that relationship is significant. Regression analysis yields the coefficient of determination (r^2), which defines the proportional amount of variability explained by the regression model. The r^2 value ranges from 0.0 , which means no variability to 1.0 , which indicates that 100% of the variability is explained by the model. If the r^2 value is high (>0.7), the regression model is significant.

Graphical presentation of the regression model (Fig. 3) gives an intuitive feel for the data, and a better understanding of the model. If there is a wide range of values, the data should be plotted on different scales to observe the impact that high or low values may have on the model. If several different models are used, they should be plotted together for comparison purposes. The model that is most meaningful, i.e. the one that omits outliers and retains data bracketing action level concentrations, should be used for final evaluation of the XRF data.

The residuals of the regression model should be examined for outliers (Fig. 4). The residuals are the differences between the predicted dependent values and the actual dependent values. A plot of residuals versus dependent values should be a random scattering of points about the zero residual line. Anomalies or outliers are usually apparent. If any outliers are present, the regression analysis should be performed without these values to determine their impact upon the model. If the sample size for regression is small (less than eight observations), removal of data points should be avoided because removal greatly increases the error associated with the regression analysis.

Fig. 5 illustrates the effect that significant outliers can have on a regression model. Several samples (8 of 210 total) had laboratory results significantly higher than FPXRF analysis.

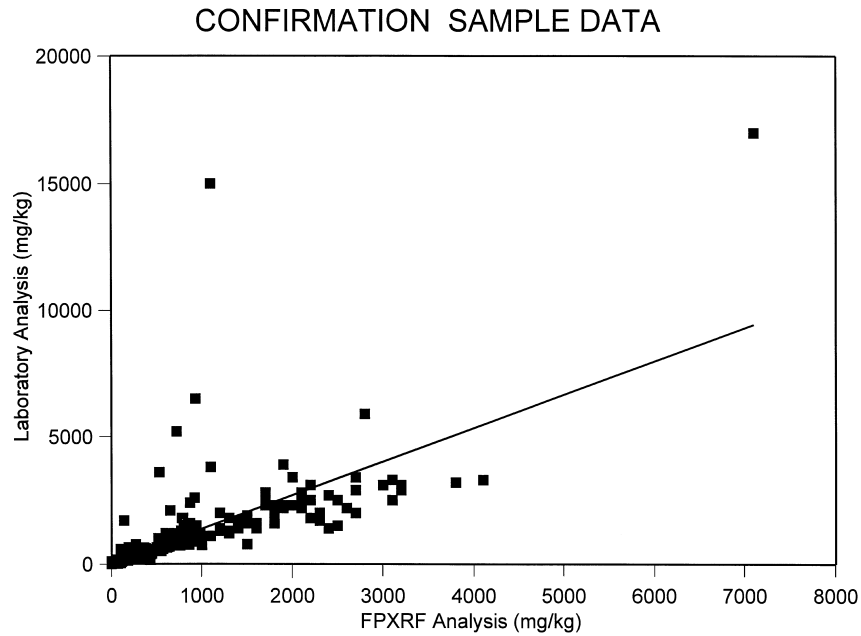


Fig. 3. Graphical representation of regression analysis results.

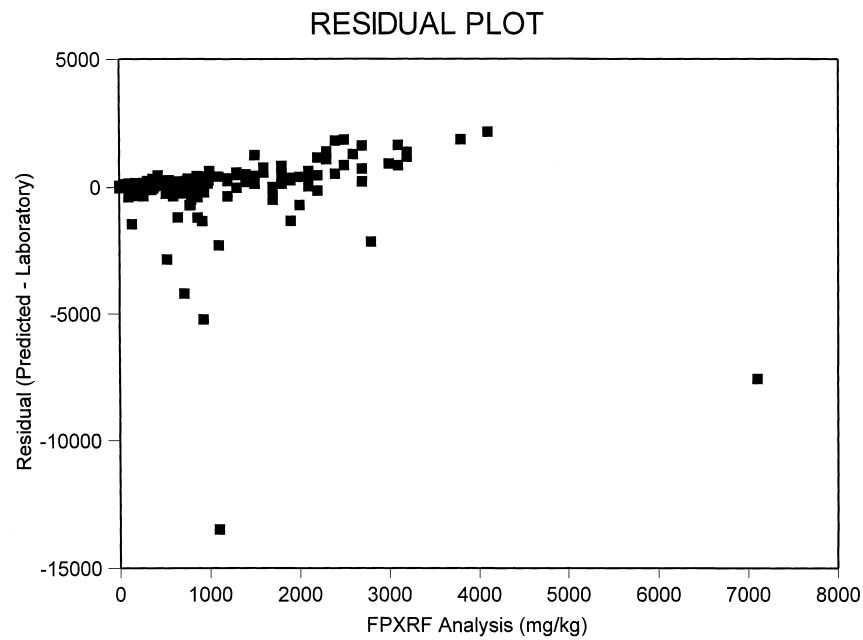


Fig. 4. Regression analysis: residual plot.

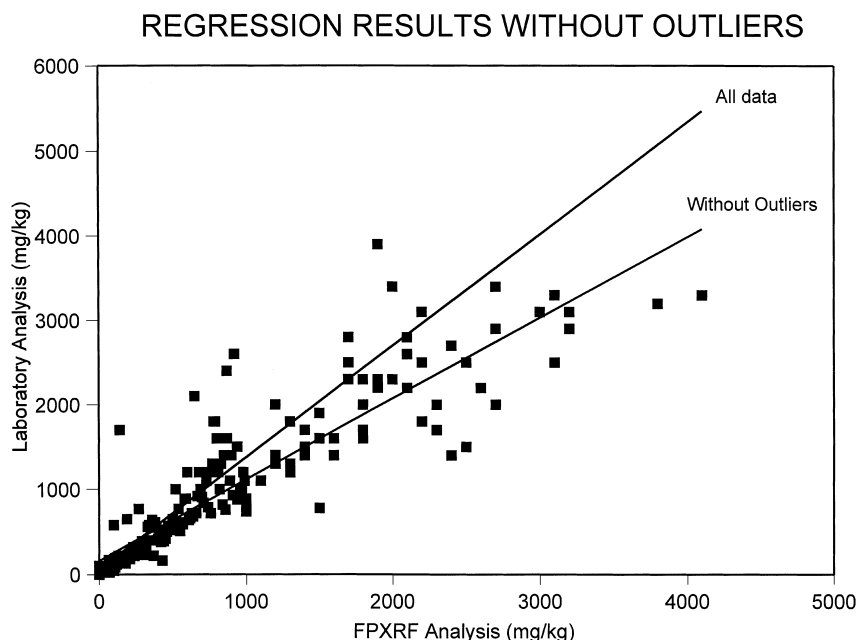


Fig. 5. Effect of outliers on regression analysis models.

This produced an artificially high slope (approximately 1.3) for the regression, and QA2 data objectives ($r^2 > 0.7$) were not met. This may be indicative of the “nugget” effect, where the laboratory sample (typically only 1 g) may have contained a small “nugget” of analyte resulting in a high laboratory result for the sample. Removal of the potential outliers yielded a regression with slope of 0.958, greatly improved r^2 value (0.836), and better agreement with data bracketing the action level. This was the most meaningful regression analysis for evaluating FPXRF performance for this data set.

8. Advantages and disadvantages

The environmental community has accepted FPXRF methodology as a viable cost- and time-effective analytical approach for analyzing a variety of hazardous materials [31,37–39]. FPXRF analysis offers many advantages and few disadvantages compared to conventional contract laboratory program (CLP) methods that have historically been employed for analysis of environmental samples.

FPXRF analyzers are generally less sensitive (have higher DLs) than laboratory methods, however, results are sufficient to meet site action level requirements in most cases. FPXRF results are typically surface measurements only; therefore, sampling location, preparation, and homogenization are important for in situ measurements. Additionally, FPXRF analyzers are subject to physical matrix effects due to variations in the physical character of the

sample. Physical matrix effects can also deteriorate the quality of laboratory results. Most FPXRF analyzers employ radioisotope sources for sample excitation; these sources have finite useful lifetimes (defined by their half-life), and must be replaced at regular intervals (typically, every 2–4 years) by the instrument vendor. Furthermore, use of radioisotope source based instruments is governed by the US Nuclear Regulatory Commission and various state agencies.

The source/detector combination may dictate the choice of the FPXRF analyzer best suited for a given application. The source(s) must be able to efficiently excite the elements of interest, and the detector must be able to resolve them. FPXRF instruments employing solid-state semiconductor detectors generally have better DLs for most elements than proportional counter-based systems. Proportional counter detectors typically have significantly poorer resolution than semiconductor devices; therefore, they are less able to resolve X-ray spectral overlaps. This means that calibration of certain element combinations may be impossible solely due to detector limitations.

On-site availability of FPXRF analysis maximizes analytical coverage while minimizing costs, providing site managers with the near real-time data necessary to guide critical field decisions in extent of contamination, removal, and remedial actions. In situ measurement capabilities minimize time spent on physical sample collection and preparation, and eliminate shipping and sample custody considerations. Rapid field screening capabilities (QA1 data) allow analysis of a large number of samples in a short period of time, providing cost- and time-effective delineation of contaminant distributions. QA2 data objectives are readily achievable with 10% laboratory confirmation of field data. Denser sampling grids may be employed, which reduces the possibility of missing “hot spots” and increases the reliability of decisions based on spatial models delineating the extent of contamination. Multiple sample types (e.g. soils, thin films, paint) may be analyzed with the same FPXRF analyzer by utilizing different application models stored in memory. Furthermore, most FPXRF analyzers provide field storage of results and X-ray spectra as well as downloading capabilities to facilitate reporting of results and QA/QC verification of the field data. Finally, minimal operator training is required, and reliable results are readily obtained by utilizing well-defined QA/QC procedures. FP-based FPXRF analyzers provide additional capabilities for qualitative and quantitative analysis of samples without the need for site-specific calibration standards. This is a very useful feature and can be extremely important for emergency response situations where reaction time is critical and such standards are not available. It is also useful for assessment and removal activities where the sample matrix varies widely over the site.

The US Environmental Protection Agency’s Environmental Response Team (US EPA/ERT) leads the efforts to utilize on-site analytical support to assist on-scene coordinators (OSCs) and remedial program managers (RPMs) in conducting extent of contamination studies, as well as removal and remedial operations in an efficient manner. On-site analytical support enables site managers to take quick and responsive action; it also saves enormous amounts of time and cost due to the rapid turnaround of analysis results. The US EPA/ERT has successfully utilized FPXRF on-site support to characterize metallic contamination in soils/sediment and other media at many hazardous waste sites [27,31]. Advances in hardware, software, and sample handling procedures have enabled the US EPA/ERT to expand the use of FPXRF technologies and still meet strict data quality requirements. To meet these requirements, the US EPA/ERT developed written standard operating procedures

(SOPs) that optimize the accuracy and precision of FPXRF data when compared to standard laboratory extraction procedures, followed by AA or ICP analysis [9,40]. The US EPA Office of Solid Waste and Emergency Response has also issued a method for FPXRF analysis of soil and sediment [41]. Today, FPXRF is widely accepted as the analytical method of choice when addressing most metals contaminated hazardous waste sites.

9. Other FPXRF applications

9.1. Testing lead-based paint

Portable XRF analyzers have been successfully utilized since the 1970s for testing lead-based paint during exposure and abatement studies. These analyzers have typically been pre-calibrated by the manufacturer using certified lead-in-paint standards. A number of source/detector configurations are employed for these analyzers. Typically, they measure K-series lead radiation in the 70–88 keV range. Some analyzers, however, employ L-series measurements in the 10–15 keV range or allow analysis of both the K- and L-series lead lines. The sources commonly used for K-series excitation are cobalt-57 (Co-57), which emits radiation at approximately 120 keV, and cadmium-109 (Cd-109), which emits radiation just above the lead K-absorption edge (88 keV). The Cd-109 source also emits radiation in the 22–25 keV region that can efficiently excite lead L-series X-ray lines. A curium-244 (Cm-244) source may also be used to excite lead L-lines [42]. The relatively high energy emitted by the Co-57 source poses some radiation hazards to operators who must complete a radiation safety course approved by the US Nuclear Regulatory Commission prior to using Co-57 based instruments. Several different types of X-ray detection systems are used in portable XRF lead-based paint analyzers. Gas proportional counters or solid-state detectors are most commonly used; solid-state detectors typically have better spectral resolution capabilities than proportional counters. Analyzers may also differ in the way that they process spectral data; direct readers only process X-ray data from lead, while spectrum analyzers process the entire spectrum including scattered source X-rays.

XRF measurement of lead-based paint is susceptible to variable scattering of the source X-rays from the substrate material beneath the paint layers. Portable lead-in-paint XRF analyzers typically provide corrections for substrate scattering. The effectiveness of these corrections depends on the substrate material, the lead X-ray line measured, the source/detector combination, and how the analyzer processes spectral data. Generally, the higher energy sources used for K-shell excitation penetrate deeper into the substrate and require greater substrate corrections. This limits the achievable DL to the order of 1 mg/cm². DLs on the order of 0.1–0.2 mg/cm² are possible with L-shell excitation using Cd-109 sources due to minimization of substrate scattering, since the Cd-109 source X-rays do not penetrate as deeply into the substrate. Furthermore, depending on the X-ray line measured (K-shell or L-shell), the analysis may also be affected by the paint matrix and the number of overlying layers.

Increased interest in the potential impact on health from environmental lead has resulted in an increase in the number of Federal, State, and local Government programs committed to sampling and analysis of lead in paint, soil, and household dust [40,42–45]. Laboratory

methods, portable XRF analyzers, and other field testing technologies have been evaluated with respect to their suitability for analysis of lead-based paint [46,47]. Field tests were performed to establish accuracy, bias, precision, and susceptibility to substrate effects using representative building materials as substrates. Results of these evaluations indicated that portable XRF technology was the preferred method for field testing lead-based paints. Chemical test kits were generally not successful in discriminating accurately between lead-based and non-lead paints and, therefore, could not provide information on the extent of lead-based paint in a home. The primary XRF conclusion of the study was that testing using K-shell XRF instruments was a viable way to test for lead-based paint, provided that laboratory analysis was used to confirm inconclusive XRF results and substrate correction was applied to reduce biases.

9.2. *Additional applications*

Portable XRF techniques have been successfully applied to other environmental applications including: field screening air monitoring filters for metals [15], airborne particulates in battery manufacture [48], lead in drinking water [49], underwater and on-board sediment analysis [50,51], uranium in soil and sediment [52], lead in workplace air [53], lead contamination of carpeted surfaces [54], in situ analysis of lead on high volume filters [55], and uranium and technetium in concrete and metals [56].

10. Conclusions

FPXRF methodology provides a viable, cost- and time-effective approach for on-site analysis of a variety of environmental samples. FPXRF results provide both qualitative and quantitative information about site contamination. The US EPA/ERT has successfully utilized FPXRF instruments for on-site analysis of metals contamination in soils and sediments to guide evaluation/removal programs at numerous hazardous waste sites. Portable XRF technology is the preferred method for field testing lead-based paints during exposure studies and abatement actions. FPXRF further provides rapid non-destructive on-site capabilities for analyzing filters, wipes, and other thin sample applications.

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January 14, 2019

By email to pope.janet@epa.gov

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Chicago, IL 60604

Re: Comment on USS Lead Superfund Site (EPA ID IND 005 174 354)
Proposed Record of Decision Amendment

Dear Ms. Pope,

The East Chicago Calumet Coalition Community Advisory Group (“CAG”), Northwestern Pritzker Law Environmental Advocacy Clinic, and the Abrams Environmental Law Clinic at the University of Chicago Law School submit these comments regarding the United States Environmental Protection Agency’s (“USEPA”) November 2018 Proposed Record of Decision Amendment (“PRODA”) for the USS Lead Superfund Site in East Chicago, Indiana.

USEPA’s PRODA offers an opportunity to right an environmental injustice by removing all the known lead and arsenic contamination from the soil of Zone 1 of Operable Unit 1 of the USS Lead Site. USEPA should revise this PRODA for Zone 1 in a way that protects the public health of this overly burdened community¹ and reflects the most up-to-date health and environmental assessment data available. Only Alternative 4D, excavation of contaminated soil to native sands, removes all the contaminated soil. USEPA should select Alternative 4D, but it also should expedite the groundwater

¹ The USS Lead Site is an environmental justice community. USEPA, *U.S. Smelter and Lead Refinery Inc. Superfund Site, OUI Record of Decision* (“2012 ROD”), 15 (2012), available at <https://semspub.epa.gov/work/05/446987.pdf>.

remediation at the site (which is part of the Operable Unit 2 remedy); inclusion of the groundwater cleanup at this time would avoid both leaching of contamination into the groundwater and contamination spreading from the groundwater to the clean soil. When the remediation is complete, Zone 1 should be cleaned to the most protective level possible so that residents feel safe in their community. In light of the devastating and permanent health impacts of the contamination caused by the responsible parties, the decades of delay by government, and community preference, the most protective cleanup is the only acceptable approach for Zone 1 of the USS Lead Site.

These comments will explain that, based on its own analysis, USEPA should have selected Alternative 4D over Alternative 4B for at least three reasons. First, Alternative 4B does not protect public health or the environment. Alternative B leaves a tremendous amount of contamination in the ground and restricts activities below 24,” which makes future home building virtually impossible. Alternative 4B also does not address the contamination of groundwater. Second, the required balancing criteria favor Alternative 4D because it comes closest to providing a permanent cleanup. Third, Alternative 4D is the only plan with widespread community acceptance.

USEPA’s PRODA also relies on a flawed understanding of the site, and inadequate community participation in the decision-making of the future use of the site. These comments will draw attention to several substantial gaps in the PRODA. Despite the known errors of the original 2012 Remedial Investigation, 2012 Human Health Risk and 2011 Agency for Toxics Substances Report at the USS Lead Site, USEPA did not consider more up-to-date, site-specific information such as the 2017 Amereco Phase II Environmental Site Assessment and the 2018 Agency for Toxic Substances and Disease Registry report. In addition, the public process for the PRODA has failed to afford all

residents an opportunity to present oral comments. Moreover, the PRODA's unusual contingency plan allows USEPA to circumvent further public input by allowing USEPA to switch plans after the comment deadline.

I. Background

A. History of Contamination at the West Calumet Housing Project.

For generations, thousands of residents lived on the USS Lead Site, unaware that extremely high levels of lead and arsenic posed grave risks to their health. Historically, several lead smelters and a lead arsenate pesticide facility operated in the area surrounding the residential community known as Operable Unit 1 of the USS Lead Site. Government officials knew about the contamination even before 1972, when the East Chicago Housing Authority intentionally built public housing on top of the former Anaconda lead smelter.² At many points over the last 40 years, government officials failed to take action when faced with new information about the contamination—at great cost to the well-being of the impacted community.

Before the summer of 2016, the West Calumet Housing Complex (“WCHC”) housed more than 1,000 people, including almost 700 children.³ Goodman Park offered the community a playground, a pool, a sledding hill. Many children walked the short distance to the Carrie Gosch Elementary School, also in Zone 1. What residents did not know was that they were being exposed to extremely high levels of arsenic, lead, and other contaminants.

² The director of the agency would later be indicted for taking bribes from developers. *See, Lead Crisis in Housing Project was Actually No Surprise*, ASSOCIATED PRESS (Sep. 23, 2016), available at <https://apnews.com/0d508d2021bb45319a41708973ef7650>.

³ *Id.*

The public health crisis of the WCHC and the USS Lead Site became a national news story when, in July 2016, East Chicago Mayor Anthony Copeland ordered the relocation of WCHC residents and announced a plan to demolish the WCHC. He based his decision on newly revealed data collected by USEPA. Some soil samples at the WCHC showed lead as high as 91,000 parts per million (“ppm”)—more than 200 times the action level of 400 ppm. An indoor sample revealed 32,000 ppm of lead. Considering that no amount of lead is safe, the level of contamination at this site is unconscionable. Arsenic levels also dramatically exceeded the 26 ppm action level and were as high as 3,530 ppm, or more than 130 times above the standard.⁴

The contaminants at this site cause acute and chronic physical and mental health problems. Lead poisoning causes irreversible neurological harm and results in numerous and severe morbidities, such as significant biological and neurological damage affecting cognition, behavior, bodily functions, growth, and development.⁵ It is unsurprising that the Agency for Toxic Substances and Disease Registry’s (“ATSDR”) 2018 report about the USS Lead Site demonstrated that children in Zones 1 and 2 were up to three times more likely to have elevated blood lead levels than children in other parts of industrialized East Chicago.⁶ Arsenic, which is also present at the site, is a known carcinogen that can cause liver, bladder, and lung cancer.⁷

⁴ USEPA, *Results of Lead and Arsenic Testing in the West Calumet Housing Complex* (2016), available at <https://www.epa.gov/uss-lead-superfund-site/west-calumet-housing-complex-east-chicago-ind>.

⁵ Elise Gould, *Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control*, 117 ENV. HEALTH PERSP. 1162, 1162 (2009).

⁶ ATSDR, *Health Consultation*, 3 (Aug. 8, 2018), available at https://www.atsdr.cdc.gov/HAC/pha/USSmelterandLeadRefinery/US_Smelter_Lead_Refinery_HC_2018-508.pdf

⁷ USEPA, *Action Memorandum-Fifth Amendment: Request for a Change in Scope and Ceiling Increase for the Time-Critical Removal Action at the U.S. Smelter and Lead Refinery Site, East*

In September 2016, the Mayor announced the WCHC would be demolished, and USEPA put on hold its remediation of Zone 1. Without the hardscapes and buildings on the site, a new remediation plan would be necessary. By June 2017, the last few residents of Zone 1 had been forced to leave, and in 2018 the WCHC was demolished. The Carrie Gosch School building on the site had already been closed, and its students relocated to another school building off-site.

Testing of the soil under the former WCHC, required as part of the environmental assessment required before the WCHC demolition, revealed even more startling news about the depth and severity of the contamination. Lead and arsenic are present in massive concentrations “throughout the site,” in both the deep soil and groundwater.⁸ Samples taken four feet below ground level show lead at levels as high as 23,000 ppm and arsenic levels as high as 5,200 ppm, well above the 400 ppm and 26 ppm action levels, respectively.⁹ Arsenic exceeded the groundwater screening levels in 13 samples, in some cases by as much as 50 times the standard. Lead in the groundwater exceeded the screening levels in 16 wells, in some cases by as much as 100 times. While the contractors did not test below six feet, they reported that parts of the former Anaconda plant are buried as deep as 11 feet below ground.¹⁰ The environmental assessment report concluded: “Additional investigation is recommended to identify the source area and delineate the contamination vertically and horizontally.”¹¹

Chicago, Lake County, Indiana (Site ID # 053J), at 10 (March 2017), available at <https://semspub.epa.gov/work/05/933033.pdf>

⁸ Amereco, *Phase II Environmental Site Assessment* (Feb. 17, 2017), available at <https://semspub.epa.gov/work/05/941443.pdf>

⁹ *Id.* at 11.

¹⁰ *Id.* at Appendix B.

¹¹ *Id.* at 15.

B. USEPA's Proposed Amended Remedy for Zone 1

In response to the changed site conditions, USEPA was forced to adopt a new plan to remediate Zone 1. This new plan is the subject of the PRODA, which lays out the alternatives for the new course of action. This comment focuses on the remedial alternatives that include excavation, especially Alternative 4B and Alternative 4D.¹² These alternatives recognize the need to remove the contamination from the residential area of the USS Lead Site. Alternative 4B, which is USEPA's preferred remedy, removes the top 24" of soil.¹³ Alternative 4D removes all soil, fill, and slag down to the native sand.¹⁴ Each alternative replaces the excavated soil with clean fill, and USEPA has stated that either remedy would allow the site of the former WCHC to be used for residential purposes after remediation.¹⁵

While USEPA prefers Alternative 4B, the PRODA also includes a contingency to switch from Alternative 4B to Alternative 4A if "a sufficient level of certainty exists that an actual change in future land use to industrial/commercial is more probable than not to occur."¹⁶ While the preferred Alternative 4B would remove 24" of soil and designate the area residential, Alternative 4A is the remedy for future industrial or commercial use; it removes the WCHC and the Goodman Park soil to a depth of 12." Notably, the PRODA

¹² We agree that certain remedial alternatives were appropriately discarded without further consideration: Alternative 2 – Institutional Controls; Alternatives 3A and 3B – that leave the pollution in place and cover the site with either soil or asphalt.

¹³ U.S. Environmental Protection Agency Region 5, *Proposed Record of Decision Amendment, U.S. Smelter and Lead Refinery, Inc. Superfund Site East Chicago, Lake County, Indiana* ("PRODA") 2-3 (Nov. 2018), available at <https://semspub.epa.gov/work/05/943693.pdf>.

¹⁴ *Id.* at 3.

¹⁵ *Id.* at 2–3.

¹⁶ *Id.* at 4.

relegates Carrie Gosch School, also located in Zone 1, to a footnote where it indicates that Carrie Gosch will be cleaned in a manner consistent with the 2012 ROD.¹⁷

II. USEPA Should Learn from the Past and Select the Most Protective Remedy.

Even though generations of families have been permanently harmed by the past and ongoing exposure to lead and arsenic at the USS Lead Site, USEPA still has not selected the most protective cleanup plan. The preferred Alternative 4B would leave a tremendous amount of contaminated material—100,000 cubic yards—in the ground. We rejects this proposal. Instead, USEPA should adopt the “most protective remedy”—Alternative 4D, excavation down to native sand.¹⁸

Applying the nine criteria for analyzing remedial alternatives at CERCLA sites that are set forth in Section 121 of CERCLA¹⁹ and applicable regulations,²⁰ USEPA should reject Alternative 4B and select Alternative 4D. USEPA has interpreted these regulations as dividing the nine criteria into threshold criteria, balancing criteria, and modifying criteria.²¹ First, USEPA’s preferred remedy does not meet the threshold criteria of adequately protecting human health and the environment. Second, the balancing criteria are best met here by the most protective remedy—Alternative 4D. Third, USEPA’s preferred remedy, Alternative 4B, lacks community acceptance.

¹⁷ *Id.* at note 8.

¹⁸ USEPA itself calls this the most protective remedy. *PRODA*, *supra* note 13, at 17.

¹⁹ 42 U.S.C. § 9621 (2018).

²⁰ 40 C.F.R. § 300.430(e)(9)(iii) (2018).

²¹ *PRODA*, *supra* note 13, at 17.

A. The Preferred Remedy Does Not Meet the Threshold Criteria of Protecting Human Health and the Environment and Complying with Applicable or Relevant and Appropriate Requirements.

A selected remedial alternative must meet the threshold criteria of “adequately protect[ing] human health and the environment”²² and “complying with applicable or relevant and appropriate requirements.”²³

1. Alternative B does not adequately protect human health or the environment.

The cleanup under Alternative 4B is not sufficient to address health and environmental concerns that will arise should homes be built in Zone 1. Critically, Alternative 4B also does not address the health and environmental concerns associated with groundwater.

a. Remedial Alternative 4B Would Not Make Zone 1 Safe for Houses.

USEPA has selected Alternative 4B as the preferred remedy based on the flawed assumption that contamination below 24” causes no danger to human health. This assertion is based on “agency experience.”²⁴ USEPA provides no scientific evidence in support of this statement. Zone 1 is meaningfully different than most cleanup sites because no existing housing is in place; the building of new housing stock on the site is highly likely to disturb soil below 24.”

The 24” rule is almost certainly derived from the cleanup of Superfund sites with *existing housing*. Indeed, the original 2012 remedy for Zone 1, when the WCHC still stood, required a 24” excavation on impacted soil.²⁵ When USEPA considers the benefits of 24” excavation, it imagines a world in which development is complete and residents

²² 40 C.F.R. § 300.430(e)(9)(iii)(A) (2018).

²³ 40 C.F.R. § 300.430(e)(9)(iii)(B) (2018).

²⁴ *PRODA*, *supra* note 13, at 2.

²⁵ *2012 ROD*, *supra* note 1, at 4-5.

rarely dig below two feet.²⁶ Here, however, Zone 1 is awaiting redevelopment. Any residential building in Zone 1 will require significant excavation below 24,” particularly if the houses will be built with basements, which is common in this community.²⁷ Future contractors would need to excavate a significant amount of additional earth for this kind of construction, which raises concerns over whether building contractors will have the financial capacity and expertise needed to handle properly the contaminated material and protect nearby residents and workers.²⁸

Utilities pose an additional problem, which is relevant no matter what type of construction occurs at the site. The houses will need to be hooked up to gas, water, and electric. Many of these utilities are buried deeper than 24.” Indeed, some of the existing infrastructure is dated and will require replacement or adaptation to the new construction. The water service lines are almost certainly made of lead. If Alternative 4B is selected, residential construction in Zone 1 will be dangerous, expensive, and ultimately unlikely. The responsible parties should bear the costs of properly cleaning up the soil to native sands—not the housing developers, small contractors, future homeowners, utilities or the City of East Chicago.

Even if some of these issues are addressed, future residents may not have the knowledge of the contamination or the wherewithal to modify their activities to avoid the

²⁶ USEPA states that “gardening is the only activity that goes below 12.” *PRODA*, *supra* note 13, at 2.

²⁷ The Indiana Residential Code, 675 Indiana Administrative Code 14-4.3, requires all one or two family dwellings in Lake County to place footings at least 36” below ground for protection from frost heave. This virtually guarantees any new construction in Zone 1 will impact the contaminated soil left in the ground.

²⁸ Even if the future contractors could remove the sub-24” soil in a safe manner for this kind of construction, the remaining soil surrounding the basements would remain contaminated by lead and arsenic. It is precisely this problem that afflicts the residents of Zones 2 and 3, where basement flooding transports contaminants from subsurface soil into their homes and sumps.

contamination. Over time, there will be less and less awareness of the institutional controls at the site.²⁹ Certain individuals may want to build an addition to their home or a large shed that requires footings. They may not be aware of or capable of addressing the contamination, thereby exposing themselves and others to toxics when they proceed with construction.

In addition to the challenges of construction at this site, there are other significant risks of future exposure to the sub-24" contamination. Zone 1 sits in a dynamic ecosystem prone to flooding and erosion.³⁰ Unusual weather events such as major storms are expected to increase in the coming years.³¹ The impact of more extreme weather on the fragile ecosystem under Zone 1 threatens to overwhelm the 24" barrier, exposing contaminated soil and mobilizing contaminants.³² The PRODA does not consider potential flooding or threats associated with climate change.

²⁹ This "atrophy of vigilance" is common at Superfund sites. The case of Midvale, Utah is instructive. There, USEPA remediated a mixed residential/industrial site with a mix of excavation and institutional controls. These institutional controls required permits and testing prior to any digging. EPA even reimbursed the municipality for compliance costs. Yet no one ever followed this process. Within a few years, city workers would inadvertently find private and state excavations of contaminated soil, including a state road project. Env'tl. Law Inst., *Protecting Public Health At Superfund Sites: Can Institutional Controls Meet The Challenge?*, 37, 45-48, 58. (1999), available at <https://www.eli.org/sites/default/files/eli-pubs/d10.01.pdf>. See also, Sara Fox, *CERCLA, Institutional Control, and the Legacy of Urban Land Use*, 42 Env'tl. L. 1211 (2012).

³⁰ The Indiana Harbor Shipping Canal is located immediately adjacent on the western boundary of Zone 1. The entire area is considered within the fluvial erosion area of the canal. Indiana Department of Natural Resources, Fluvial Erosion Hazards in Indiana, <https://indnr.maps.arcgis.com/apps/webappviewer/index.html?id=43e7b307a0184c7c851b5068941e2e23>. Further, at least a portion of Zone 1 sits in a flood zone. See Indiana Department of Natural Resources Indiana Floodplain Mapping (searchable by address), <https://indnr.maps.arcgis.com/apps/MapSeries/index.html?appid=48665e0948b04b398fbc07b8ea1cf232>.

³¹ Chelsea Harvey, "Extreme Weather Will Occur More Frequently Worldwide E&E News (February 15, 2018), available at <https://www.scientificamerican.com/article/extreme-weather-will-occur-more-frequently-worldwide/>

³² EPA, "Superfund Climate Change Adaptation," (last visited on 1/14/19), <https://www.epa.gov/superfund/superfund-climate-change-adaptation>

In short, Alternative 4B is wholly insufficient to restore Zone 1 for actual homebuilding and does not adequately protect human health and the environment.

b. Remedial Alternative 4B Does Not Address the Health and Environmental Concerns Associated with Groundwater.

USEPA has stated repeatedly that it will consider the groundwater under Zone 1 as part of the ongoing Operable Unit 2 remedy,³³ but USEPA must also consider groundwater in the PRODA because it is part of the environment, as defined by CERCLA.³⁴ Under Alternative 4B, USEPA would leave behind contaminated soil that would leach arsenic and lead into the groundwater. In turn, the contaminated groundwater, which sometimes flows near the surface, also may contaminate the clean fill.

Because the groundwater investigation is in its earliest phase,³⁵ USEPA does not yet fully understand the nature and movement of the site's groundwater contamination. At the public meeting, USEPA characterized the present groundwater contamination below Zone 1 as "limited,"³⁶ but the available reports show otherwise. The Phase II Site Assessment reveals that arsenic levels exceed safe limits in 14 of 34 groundwater samples in Zone 1.³⁷ Seventeen wells contained lead in excess of Indiana Department Environmental Management ("IDEM") standards.³⁸

³³ 2012 ROD, *supra* note 1, 9; see also USEPA, *Operable Unit 2 – Update Oct. 2018*, <https://www.epa.gov/uss-lead-superfund-site/operable-unit-2-uss-lead-superfund-site>

³⁴ CERCLA regulations define "environment" as "the navigable waters [...] and any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States or under the jurisdiction of the United States." 40 C.F.R. § 300.5 (2018).

³⁵ USEPA, *EPA Oversees Installation of Groundwater Monitoring Wells at the USS Lead Superfund site, East Chicago, Ind.*, available at <https://www.epa.gov/newsreleases/epa-oversees-installation-groundwater-monitoring-wells-uss-lead-superfund-site-east>

³⁶ The transcript of this meeting remains unavailable because of the federal shutdown.

³⁷ *Phase II Site Assessment*, *supra* note 8, at 12.

³⁸ *Id.*

Groundwater contamination may negatively impact the health of community members throughout the USS Lead Site. Although East Chicago pulls its drinking water from Lake Michigan, the groundwater contamination may reach residents in other ways, particularly considering the shallow depth of the region's groundwater.³⁹ For example, floodwaters containing contaminated groundwater may re-contaminate Zone 1 soil or enter residents' basements, further contaminating their homes and possessions.⁴⁰ Without a thorough study of the risks posed by groundwater contamination, USEPA cannot predict the ultimate health consequences of ignoring groundwater in the PRODA. Without more certainty, the PRODA has failed to meet the threshold standard of protecting human health.

By refusing to address the groundwater concerns, Alternative 4B does not protect the environment. In addition, Zone 1 is hydraulically connected to the Indiana Harbor Shipping Canal, the Grand Calumet River, and the Lake Michigan watershed.⁴¹

³⁹ The water table in East Chicago runs from 0 to approximately 5 feet deep. The water table level is primarily set by the level of Lake Michigan, which is presently high. *U.S. Geological Survey Water-Resources Investigations Report 92-4115*, 2 (1993); <https://pubs.usgs.gov/wri/1992/4115/report.pdf>; Northwest Indiana Times, "Lake Michigan water levels at the highest point in 20 years causing headaches for some who call the beach home," (June 11, 2018), https://www.nwitimes.com/news/local/lake/lake-michigan-water-levels-at-highest-point-in-years-causing/article_241032cc-4135-5f39-b8b3-2d8c8fce4224.html. Also, residents in the Zone 2 and Zone 3 regularly report groundwater seepage in their basements. USEPA should have considered this issue more rigorously before deciding to leave the contamination in the ground.

⁴⁰ At the public meeting, USEPA said that if the sub-24" contamination proves to be a source for groundwater problems, USEPA will initiate a pump and treat option. Yet in the RCRA remediation at the neighboring DuPont site, USEPA rejected pump-and-treat because it does not meet "green remediation practices." USEPA, *DuPont Statement of Basis*, 20 (2017), available at https://www.epa.gov/sites/production/files/2017-11/documents/final_dupont_east_chicago_western_portion_statement_of_basis_-_11-2-17_2.pdf. As is discussed below under II.B., the most effective treatment option is to remove the contamination now.

⁴¹ Joseph M. Fenelon And Lee R. Watson, *Geohydrology and Water Quality of the Calumet Aquifer, in the Vicinity of the Grand Calumet River/Indiana Harbor Canal, Northwestern Indiana* *U.S. Geological Survey Water-Resources Investigations Report 92-4115*, 2 (1993) (noting that the study would support efforts to understand whether contaminated groundwater was degrading Lake Michigan water quality), available at

Groundwater from the site may contribute to the contamination of these various bodies of water. It is in the best interests of the community and the environment for USEPA to address groundwater contamination during the course of this remediation.

In addition to omitting groundwater and waterways, the PRODA also leaves out any consideration of wildlife found at the USS Lead site. When USEPA prepared the 2012 ROD, it summarily concluded that no ecological risk assessment was needed.⁴² USEPA has not considered whether the documented presence of a bald eagle nest in nearby Operable Unit 2 of the USS Lead Site alters that conclusion.

Thus, USEPA should revisit its analysis of the public health and the environment criterion for each alternative.

2. Alternative B Does Not Comply with Applicable Indiana Law

USEPA must assess a second threshold criterion—whether each alternative complies with “applicable or relevant and appropriate requirements” (“ARARs”).⁴³ But that has not happened here. USEPA merely included a table of ARARs; it did not evaluate them.

In particular, USEPA did not evaluate Alternative B’s compliance with Indiana code that relates to leaching of contaminants from soil to groundwater. The Indiana Remediation Closure Guide provides

[r]esidential migration to ground water screening levels apply to chemicals present in vadose zone soils. Exceedance of residential migration to ground water screening levels suggests the potential for chemicals in the soil to leach to ground water at concentrations that exceed residential ground water direct contact screening levels.⁴⁴

<https://pubs.usgs.gov/wri/1992/4115/report.pdf>.

⁴²2012 ROD, *supra* note 1, at 15 (2012).

⁴³ 40 C.F.R. § 300.430(e)(9)(iii)(B) (2018).

⁴⁴ Indiana Department of Environmental Management (“IDEM”), *Indiana Remediation Closure Guide*, 163, Appendix A, available at https://www.in.gov/idem/cleanups/files/remediation_closure_guide.pdf. Although the Guide

The Feasibility Study (“FS”) lists the Indiana Voluntary Remediation act as an ARAR.⁴⁵

It also acknowledges that the Phase II Site Assessment found samples that greatly exceeded the Indiana Closure screening levels. Nonetheless, neither the FS nor the PRODA analyze the threat to groundwater at all and do not demonstrate that Alternative 4B meets this ARAR.

USEPA should undertake a proper analysis of all ARARs before finalizing its remediation plan here.

B. The Two Most Important Balancing Criteria—Permanence and Reduction of Toxicity—Support Alternative 4D.

Although Alternative 4B does not meet the threshold criteria for the reasons stated above, for plans that do meet the threshold criteria, USEPA must weigh the five balancing criteria: long-term effectiveness, reduction of toxicity and mobility through treatment, short-term effectiveness, implementability, and cost.⁴⁶ These criteria are not equal: “Long-term effectiveness and permanence” and “reduction through treatment” are the two most important.⁴⁷ Indeed, “permanence is a major theme of CERCLA Section 121” and “is often decisive where the alternatives vary significantly” in the amount of toxic materials left onsite.⁴⁸ In addition, “those criteria that distinguish the alternatives the most will be the most decisive factors in the balancing.”⁴⁹ Alternative 4D is the only

states that site-specific levels may be set higher than screening levels, it requires a risk characterization in those cases. *Id.* at 16.

⁴⁵ USEPA, *Feasibility Study Report for USS Lead OUI Zone 1 Site East Chicago, Indiana* (2018) at Table 4-2.

⁴⁶ PRODA, *supra* note 13, at 17.

⁴⁷ 40 C.F.R. § 300.430 (2018). (“The balancing shall emphasize long-term effectiveness and reduction of toxicity, mobility, or volume through treatment”). *See also* USEPA, OSWER 9355.0-27FS, *A Guide to Selecting Superfund Remedial Actions* (“Guide”), 3–4, <https://www.epa.gov/superfund/key-principles-superfund-remedy-selection>

⁴⁸ *Guide*, *supra* note 47, at 4.

⁴⁹ *Id.* at 5.

remedy that is permanent and effective over the long term, and it results in the greatest reduction of toxicity. The only criteria that cut against Alternative 4D are less important under CERCLA. There is little difference among the remedies along the dimensions of implementability and cost. It appears USEPA has chosen Alternative 4B principally based on the balancing factor of cost, which is contrary to regulation and guidance.

1. EPA Should Select Alternative 4D Because It Is the Remedy that is Permanent and Effective Over the Long-Term and that Reduces Toxicity to the Maximum Extent Practicable.

“Long-term effectiveness and permanence” is one of the “two most important” balancing factors,⁵⁰ and USEPA notes that Alternative 4D “provides the greatest degree” of long-term effectiveness, requiring no operation and maintenance or institutional controls.⁵¹ It is not a matter of degree, it is a matter of kind; Alternative 4D is permanent and effective over the long-term, while the other alternatives are not. Alternative 4D does not depend on good luck or the future goodwill of anyone. It neither depends on USEPA’s attention nor residents or developers adhering to the underground warning barriers or deed restrictions for decades in the future. Unlike any other plan, Alternative 4D completely removes the contamination from the soil.

The other most important balancing factor is “reduction through treatment,”⁵² and Alternative 4D achieves the greatest reduction of toxicity and mobility of contaminants.⁵³ USEPA estimates Alternative 4D will remove and treat more than 1.5 times the volume of contaminated soil as Alternative 4B.⁵⁴ The amount of toxic metals removed may be

⁵⁰ *Id.* at 3-4.

⁵¹ *PRODA*, *supra* note 13, at 19.

⁵² *Guide*, *supra* note 47, 3-4.

⁵³ *PRODA*, *supra* note 13, at 19.

⁵⁴ *Id.* at 14-15.

even higher than USEPA's estimate because the soils below 24" are more contaminated than those above 24." USEPA tested down to 30" in Zone 1 and found the highest arsenic concentrations between 24" and 30."⁵⁵ The Phase II Site Assessment tested down to six feet and found even very high levels of lead and arsenic below 30." USEPA also recognizes the existence of plant debris down to eight feet. Alternative 4D also does more to protect the groundwater than all the other remedies by removing the contaminated soil as a source of pollution.⁵⁶ If USEPA selects an alternative other than Alternative 4D, contamination will continue to leach into the groundwater, a principal concern in mobility reduction.⁵⁷

2. Implementability and Short-Term Effectiveness Are Not Determinative.

Because the criteria of implementability and short-term effectiveness do not distinguish significantly between Alternative 4D and Alternative 4B, USEPA should accord those criteria little weight when it considers them as balancing factors.⁵⁸ As USEPA notes, both Alternative 4B and Alternative 4D are "readily implementable" and have been "used successfully at other environmental cleanup projects."⁵⁹ Alternative 4D takes five months longer, which makes it marginally less safe in the short term for workers and residents.⁶⁰ Likewise, Alternative 4D is slightly more difficult to implement "due to the challenges associated with excavating below the groundwater table,"⁶¹ requiring "[s]ide slope stability, dewatering of the excavation, and possibly treatment of

⁵⁵ *Id.* at 11-12, Table 1.

⁵⁶ See *supra* section I.A.1.b. As discussed above, though, USEPA should coordinate the Zone 1 remedy with the ongoing groundwater investigation.

⁵⁷ *PRODA*, *supra* note 13, at 19.

⁵⁸ *Guide*, *supra* note 47, 5 ("[T]hose criteria that distinguish the alternatives the most will be the most decisive factors in the balancing").

⁵⁹ *PRODA*, *supra* note 13, at 21.

⁶⁰ *Id.* at 20.

⁶¹ *Id.* at 21.

the contaminated groundwater.”⁶² However, the modest increase in time and difficulty pale in comparison to the profound difference in permanence and reduction of toxicity achieved by Alternative 4D.

3. EPA’s Consideration of Cost Is Flawed.

While “cost effectiveness” is a balancing factor,⁶³ it is not considered in a vacuum, and USEPA should not have given it the determinative weight that it did here.

It appears that USEPA chose Alternative 4B as the preferred remedy primarily based on cost. The selection of Alternative 4B as the preferred remedy hinges on a single sentence: “[D]igging deeper is not meaningfully more protective of potential users of the property and so does not justify the additional . . . \$22 million in estimated costs.”⁶⁴ USEPA’s conclusion lacks support.

First, this statement discounts the stated value—permanence—of fully removing the soil contamination. USEPA states that Alternative 4D is statutorily more protective: “Alternative 4D would be the *most protective* since all materials, including debris, would be excavated down to native sand and disposed of off-site.”⁶⁵ USEPA also noted that Alternative 4D “would eliminate potential exposure.”⁶⁶ In practical terms, the removal of thousands of tons of contamination sitting on top of the groundwater is “meaningfully more protective” of neighboring property owners who are in the path of that groundwater. The removal of the contamination is “meaningfully more protective” of people and wildlife that use the Calumet River, the Indiana Harbor Canal, and Lake Michigan. It is,

⁶² *Id.*

⁶³ 42 U.S.C § 9621 (2018).

⁶⁴ *PRODA*, *supra* note 13, at 22.

⁶⁵ *Id.* at 18 (emphasis added).

⁶⁶ *Id.*

simply put, “meaningfully more protective” not to live above a buried lead smelter, even if the top layer of that contamination has been scraped off. USEPA erred when it discarded Alternative 4D, without any scientific basis, on the grounds that the difference in protection is not “meaningful.”

USEPA’s analysis of cost is also flawed. USEPA relies on the cost differential of \$22 million—the maximum difference— to support its selection of Alternative 4B. This figure is improperly enlarged by two flawed assumptions. First, USEPA incorporates larger *construction* contingencies into their cost estimates for Alternative 4D (30%, or almost \$12m) than into Alternative 4B (10%, or \$2.4m). Had USEPA assumed a 10% contingency for Alternative 4D, then the differential would have been \$16m. Second, the analysis ignores *future* contingencies. Alternative 4D, as USEPA has stated, will not create future costs because it leaves no soil contamination behind.⁶⁷

USEPA guidance explains the circumstances in which cost can serve as a deciding factor: “Cost may play a significant role in selecting between options that appear comparable with respect to the other criteria, particularly long-term effectiveness and permanence.”⁶⁸ However, as discussed above, Alternative 4D and Alternative 4B are not comparable with respect to long-term effectiveness and permanence; Alternative 4D is permanent and effective over the long-term, but Alternative 4B is not. USEPA is supposed to start with the alternative that meets the statutory goals of permanence and treatment and then determine whether the cost is proportional to the effectiveness of the remedy;⁶⁹ it is not allowed to ignore permanence and, in response to cost, decide a lesser

⁶⁷ *PRODA*, *supra* note 13, at 16.

⁶⁸ *Guide*, *supra* note 47, at 4.

⁶⁹ USEPA, OSWER 9200.3–23FS, *The Role of Cost in the Superfund Remedy Selection Process*, 5 (1996), available at <https://semspub.epa.gov/work/HQ/174446.pdf>.

remedy is good enough. As discussed above, the implementability and short-term effectiveness factors do not contradict Alternative 4D. Instead, it seems USEPA impermissibly used cost as the deciding factor between two incomparable remedies.

As applied here, the Superfund remedy selection analysis also neglects the long-term, saved costs associated with a more protective plan.⁷⁰ Who wins if USEPA selects the less protective option? The companies, who profited off the land for decades, will pay less to address their pollution. Meanwhile, families whose lives have been permanently altered, at great economic and emotional cost, will remain in harm's way.

USEPA should adhere to its mission and protect people over profits by selecting Alternative 4D, which removes the most contamination and offers permanence.

C. The Community Does Not Accept USEPA's Preferred Remedial Alternative.

After hearing from residents during the comment period, USEPA must consider “community acceptance” as a modifying criterion.⁷¹ Public participation is a key principle of both Superfund⁷² and environmental justice,⁷³ and “community acceptance” is the criterion that effectuates this public participation in the remedy selection phase. USEPA guidance defines this criterion as “whether the local community agrees with the USEPA’s analyses and preferred alternative.”⁷⁴

⁷⁰ USEPA’s approach to cost comparison is incomplete because it looks only at the immediate costs of the particular cleanup and does not include the long-term costs that others would have to bear to bring the site back into actual productive use.

⁷¹ 40 C.F.R. § 300.430(e)(9)(iii)(I) (2018).

⁷² 42 U.S.C. § 9617 (2018).

⁷³ See *infra* note 84 and accompanying text.

⁷⁴ USEPA, EPA 540-R-98-031, OSWER 9200.1-23(P), PB98-963241, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, A-8 (1999), available at https://www.epa.gov/sites/production/files/2015-02/documents/rod_guidance.pdf.

To date, the most protective alternative, i.e. Alternative 4D, has received overwhelming popular support from the residents impacted by the contamination. The CAG is comprised of long time and life-long residents of the USS Lead Site, including former residents of Zone 1. Other community stakeholders have also stated that the contamination in Zone 1 should be removed, not buried as a potential problem for the future. These are the highly impacted residents that guidance suggests must be heeded in analyzing the community acceptance criterion.⁷⁵ At the public meeting on November 29, 2018, oral comments universally favored removing the contamination fully.⁷⁶ Moreover, the Mayor of East Chicago has also expressed support for Alternative 4D.⁷⁷

The CAG is aware of no one in the local community who accepts USEPA's preferred alternative, Alternative 4B. No one spoke at the public meeting in support of Alternative 4B. By contrast, many in the community—including the CAG—have vocally objected to the preferred Alternative 4B.

If USEPA selects remedy Alternative 4B, it will categorically ignore the voice of the community and fail to consider meaningfully the community acceptance criterion. As former Administrator Scott Pruitt said about East Chicago: “[I]t’s time to assess and make decisions and put the community first.”⁷⁸ The story of the USS Lead Site is a story about severe harm done to a community without the residents’ knowledge. Lead smelting companies contaminated this community throughout the twentieth century; housing

⁷⁵ *Id.* at 3-9.

⁷⁶ See *infra* section III.A. Several meeting participants were holding numbers when the meeting ended because of venue constraints. To properly analyze this criterion, USEPA must hold a second public meeting.

⁷⁷ Letter from Anthony Copeland, Mayor of East Chicago, IN, to USEPA (Dec. 4, 2018).

⁷⁸ Katie Mettler, *Escaping one of the nation's worst environmental disaster zones*, WASHINGTON POST (Aug. 20, 2017), https://www.washingtonpost.com/national/health-science/escaping-one-of-the-nations-worst-environmental-disaster-zones/2017/08/20/c0020fa8-77a7-11e7-8839-ec48ec4cae25_story.html?utm_term=.5ad6a260b0bd.

agencies built public housing on top of the known contamination; and multiple levels of government failed in their task of averting the health disaster at WCHC. USEPA now must choose between honoring the input of the impacted community or perpetuating more than 40 years of environmental injustice.

D. EPA Should Incorporate Carrie Gosch into the PRODA.

The Carrie Gosch School is part of Zone 1, but USEPA has omitted it—without explanation—from this PRODA and instead indicates only that the school will “remain covered by the remedy in the 2012 ROD.”⁷⁹

The lack of attention to the plans at Carrie Gosch belies the substantial and important uncertainty that remains about that portion of the site. Based on the 2012 ROD, USEPA presumably plans to treat “impacted soil” down to 24” on the school grounds.⁸⁰ In the meantime, though, USEPA has not explained whether it has conducted testing recently on the grounds of the school, and it has not shared results of any testing done after 2010.⁸¹

The lack of information about recent soil sampling at Carrie Gosch is concerning for two reasons. First, it is possible that nearby demolition activities led to increased deposition of contaminated soil or dust at the school. Second, Amereco’s Phase II Environmental Site Assessment calls for more investigation to characterize the boundaries of the contamination under the WCHC; this contamination may well extend under Carrie Gosch, but USEPA will not find out if it fails to investigate further. Further, at the public meeting, USEPA did not say when it would complete soil remediation on

⁷⁹ *PRODA*, *supra* note 13, at note 8.

⁸⁰ *2012 ROD*, *supra* note 1, at 48.

⁸¹ See *Sampling Data Viewer*, USS Lead Superfund Site Website, <https://epa.maps.arcgis.com/apps/MapSeries/index.html?appid=d45c8610b7364b8f931fdbb748d607c1>.

the grounds of the school—under the flawed 2012 plan—despite the fact that Carrie Gosch is already being used as a church and a day care facility.

Rather than relegating the Carrie Gosch portion of the site to secondary status, USEPA needs to do more to investigate and to address the needs at school site to ensure the safety of both adults and children who regularly visit the site. The PRODA must be amended to provide a more thorough analysis of the soil and groundwater at Carrie Gosch. A proper remediation there is overdue.

III. USEPA’s Approach to the PRODA Process Has Failed to Involve Impacted Residents Meaningfully.

A. Not All Residents Were Given the Opportunity to Speak at the Public Meeting.

We object to USEPA’s process for completing the PRODA. USEPA regulations explicitly state that the public should be afforded an opportunity to submit oral and written comments on the selection of a proposed remedy, including a proposed ROD amendment.⁸² The regulations also require USEPA to hold a public meeting for the plan.⁸³ In addition, USEPA’s obligation to promote environmental justice necessitates that residents have an opportunity for “meaningful input” in the decisionmaking process.⁸⁴

⁸² 40 C.F.R. § 300.430 (f)(3)(C).

⁸³ 40 C.F.R. § 300.430 (f)(3)(D).

⁸⁴ See Executive Order 12,898, “Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,” 59 Fed. Reg. 7629 (Feb. 11, 1994). USEPA defines “meaningful involvement” so that “1) potentially affected populations have an appropriate opportunity to participate in decisions about a proposed activity [i.e., rulemaking] that will affect their environment and/or health; 2) the population’s contribution can influence [the USEPA’s] rulemaking decisions; 3) the concerns of all participants involved will be considered in the decision-making process; and 4) [the USEPA will] seek out and facilitate the involvement of population’s potentially affected by USEPA’s rulemaking process” Technical Guidance for Incorporating Environmental Justice into Regulatory Analysis, 9 (2016) (citing 2015 EJ Process Guidance), https://www.epa.gov/sites/production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf.

Here, USEPA has literally silenced resident voices. Several residents were not given an opportunity to provide oral comment at USEPA’s November 29, 2018 public meeting. The CAG submitted a letter requesting a second public comment meeting, and USEPA agreed to schedule a January 10 meeting; USEPA then cancelled the meeting due to the government shutdown.

The need for a second public meeting stands, and USEPA should have postponed the comment deadline and allowed for a public meeting after the shutdown ends.⁸⁵ Given that the USEPA has not met its burden of community involvement, community preferences—as expressed in this comment and others submitted by residents in the community—should be afforded extra weight at the very least.

B. A Contingency Plan Amendment Introduces Unacceptable and Unnecessary Uncertainty

USEPA’s proposed amended cleanup plan includes the possibility of selecting a contingency plan amendment.⁸⁶ As outlined by USEPA, this contingency plan amendment would contain conditions that, if triggered, would change cleanup standards from entirely residential to industrial/commercial in some areas and residential in others.⁸⁷ We strongly object to such an inclusion because it strips the community of its agency and because USEPA’s own criteria for inclusion of such a contingency have not been met.⁸⁸

⁸⁵ In contrast, in matters involving the United States as a party, the Department of Justice sought and received two-week extensions. *See, e.g.,* “General Order Holding In Abeyance Civil Matters involving the United States as a Party,” General Order 18-0028 (N.D. IL 12/26/31).

⁸⁶ PRODA, *supra* note 13, at 3.

⁸⁷ *Id.*

⁸⁸ We also reject Alternative 4A—even for commercial/industrial. No matter the use, it will not be entirely covered with hardscape. Different industrial/commercial uses involve differing levels of exposure to contamination. Furthermore, in the PRODA, USEPA acknowledges the difficulty of maintaining perimeter grading and stormwater management with an asphalt cap that is

USEPA has offered no limiting factor on when a change in land use pursuant to a contingency could occur. This means that in the future the land use could change without community concerns being taken into account.⁸⁹

This divestiture of power of the impacted residents is particularly troubling given the environmental justice concerns in East Chicago. The contingency plan leaves the residents “disenfranchised from the local land use planning and development process,”⁹⁰ which is “an especially important issue where there are concerns regarding environmental justice in the neighborhood around the NPL site.”⁹¹ In this context, USEPA guidance requires that “[c]onsistent with the principle of fairness, USEPA should make an extra effort to reach out to the local community to establish appropriate future land use assumptions as such sites.”⁹² The contingency plan option makes no extra effort to ensure its land use assumption, if changed, will meet the community’s needs at that time.

USEPA has stated that including a contingency “would be appropriate only if, at the time of the ROD amendment, a sufficient level of certainty exists that an actual change in future land use to industrial/commercial is more probable than not to occur.”⁹³ There is now high certainty that the future land use of Zone 1 will be residential, and thus inclusion of such a contingency would be inappropriate and unnecessary under USEPA’s own standard.

expressly designed for environmental cleanup. Such operations would be much more difficult on an operating industrial/commercial site.

⁸⁹ It is unclear whether USEPA has committed to making a decision about the use and clean up levels before it submits the revised ROD and revised consent decree to the court. If USEPA does not need to make that choice before, then there could be effectively no review by anyone of USEPA’s decision.

⁹⁰ USEPA, OSWER Directive No. 9355.7-04, *Land Use in the CERCLA Remedy Selection Process* (“*Land Use*”), 6 (May 25, 1995).

⁹¹ *Id.*

⁹² *Id.*

⁹³ *PRODA*, *supra* note 13, at 4.

USEPA guidance states that USEPA's assumptions about future land use should come from discussions with the public, as well as local land use planning authorities and local officials.⁹⁴ Additionally, USEPA has enumerated a variety of factors that it should consider when determining reasonably anticipated future land use, of which several are key here: current land use, zoning, and environmental justice issues.⁹⁵

Direction from officials and residents, as well as consideration of factors that USEPA has articulated for its determinations in this context, unequivocally indicates that the current desired and appropriate land use for Zone 1 is residential. First, the West Calumet Housing Complex parcel was residential until the 2016 evacuation and demolition of the West Calumet Housing Complex and will remain zoned as residential.⁹⁶ Had the severity of lead exposure not forced this departure, the site likely would have remained a housing complex. Importantly, environmental justice issues are particularly acute in East Chicago, and accordingly the concerns of residents should be weighted heavily. The CAG members do not want any contingencies regarding land use included in the cleanup plan because this community desperately needs certainty and assurance. Finally, Mayor Copeland recently wrote a letter to USEPA where he articulated his plans for residential development in Zone 1:

My vision for the Calumet Neighborhood is that there will be new residential development there...[t]he City...intends to do residential in-fill development within the existing neighborhood once these areas have been remediated...[m]y preference for the land use in Calumet, including West Calumet has always been,

⁹⁴ "In order to ensure use of realistic assumptions regarding future land uses at a site, USEPA should discuss reasonably anticipated future uses of the site with local land use planning authorities, local officials, and the public, as appropriate, as early as possible during the scoping phase of the RI/FS." See *Land Use*, *supra* note 90, at 4.

⁹⁵ *Id.* at 5.

⁹⁶ USEPA, "Potential for Reuse: East Chicago, IN," <https://semspub.epa.gov/work/HQ/100001469.pdf>

and will continue to be new and revitalized residential development.⁹⁷

In sum, the relevant parties and factors support a residential land use designation for Zone 1. Now that any uncertainty has been eliminated USEPA should amend the PRODA to eliminate the contingency option.⁹⁸ Otherwise, USEPA makes a mockery of CERCLA's requirement for public participation.

C. USEPA Has Failed to Engage Residents in the Redevelopment Process

In its 2010 guidance on considering reasonable anticipated land use at Superfund sites, USEPA states that Regions should “solicit broad, diverse community input as part of the Superfund cleanup process;” it recommended that USEPA “consult with the site’s stakeholder community (i.e., local governments, community groups, the site’s owners, individuals, states, tribes, etc.) to obtain input on future use options and to discuss how particular remedies may affect a site’s future use options.”⁹⁹ The guidance document encourages USEPA to solicit input from the community because “early community involvement, with a particular focus on the community’s desired future uses of property associated with the CERCLA site, should result in a more democratic decision-making process”¹⁰⁰ and because “[i]mportant information about reasonably anticipated future land uses can be learned from community members.”¹⁰¹

⁹⁷ Letter from Mayor Anthony Copeland to USEPA, Dec. 4, 2018. While the letter mentions that developers have expressed interest in the site, the speculative interest of this nature has no place in USEPA consideration of land use when unsupported by any of the relevant factors.

⁹⁸ Nothing would stop USEPA from amending the ROD again if conditions change. Moreover, nothing would prevent the use of the site for commercial or industrial purposes if it is cleaned to a residential standard.

⁹⁹ USEPA, OSWER Directive 9355.7-19, *Considering Reasonably Anticipated Future Land Use and Reducing Barriers to Reuse at EPA-lead Superfund Remedial Sites* 3 (2010).

¹⁰⁰ *Id.* (citing USEPA, *Land Use in the CERCLA Remedy Selection Process* 1 (1995)).

¹⁰¹ *Id.* at 6.

USEPA's 2017 Superfund Redevelopment Task Force Report recommended that Regions take an even more active role in facilitating redevelopment plans for Superfund sites. This active role includes facilitating relationships between local stakeholders, PRPs, and communities,¹⁰² and "connect[ing] each [Superfund] community with a similarly situated community that has had revitalization success."¹⁰³ It also asks that USEPA provide information and/or training for community members and local government about the process of redeveloping a site including "envisioning and developing an economically feasible redevelopment plan for the site,"¹⁰⁴ and financing redevelopment.¹⁰⁵ Finally, it recommends that USEPA provide technical information about the site to parties interested in redevelopment including local government, community members, and potential developers.¹⁰⁶

¹⁰² USEPA, *Superfund Task Force Recommendations* 24 (2017) (Recommendation 39: "Facilitate interactions for local stakeholders/PRPs/communities to work together. Actively encourage PRPs to engage and be supportive of the process, demonstrating that an engaged community looking to the future can speed up cleanups, have realistic expectations, act as stewards, and promote successful reuse.").

¹⁰³ *Id.* at 24.

¹⁰⁴ *Id.* at 23. *See also* Recommendation 36: USEPA should "[p]rovide training/fact sheets/on-line information on . . . [h]ow the redevelopment of the site fits with a broader vision for the economic revitalization for the community" and on "[c]ommunity partners and other resources available to Superfund communities that can provide design charrettes, and other reuse visioning support."

¹⁰⁵ *Id.* at 22 (Recommendation 39: USEPA should "[f]acilitate and take a proactive approach in involving additional funding institutions/organizations."); *see also* Recommendation 36: USEPA should "[p]rovide training/fact sheets/on-line information on. . .[t]ools/approaches necessary for local governments . . . to encourage investment" and on "[f]unding/financing mechanisms . . . available to local communities."

¹⁰⁶ *Id.* at 20 (Goal 4, Strategy 1: "Reuse is further promoted when the community, including developers, has access to more information about an individual site and the sites around it. This includes determining which types of sites businesses/industries/developers are interested in potentially redeveloping and sharing information with them to promote Superfund site redevelopment."). USEPA listed the USS Lead Site as priority for redevelopment and it went to the trouble to produce a redevelopment fact sheet for businesses, which references the planned residential zoning for much of Zone 1, but did not seek input from residents and has not produced a thorough remediate plan that will facilitate residential development at the site. *See* <https://www.epa.gov/superfund-redevelopment-initiative/superfund-redevelopment-focus-list>.

Despite this official agency direction, USEPA has failed to solicit and incorporate community input regarding community members' preferred future use of Zone 1 sufficiently when it devised the proposed cleanup plan for Zone 1. Community members have expressed frustration about the lack of redevelopment planning for Zone 1.¹⁰⁷ Earlier action by the USEPA to facilitate discussion about the redevelopment of Zone 1 may have helped to achieve a shared vision for Zone 1's future use before the issuance of the PRODA. USEPA's more complete engagement may have eliminated its perceived need for USEPA's contingency plan in the Amended Plan, which has fostered greater uncertainty about the site's future.

Moving forward, although USEPA cannot dictate the future use of Zone 1, it should go further to meet the obligations and recommendations laid out in the 2010 guidance and the 2017 report. For example, USEPA should facilitate a visioning process for the future use of Zone 1. USEPA should also provide technical information or training to community members regarding working with potential developers and financing redevelopment so that community members are able to participate more fully in the city's decision-making process for the redevelopment of Zone 1.

D. USEPA Ignored the Most Up-to-Date Data on Zone 1's Site-Specific Conditions

Even though the understanding of the USS Lead Site contamination and health impacts has dramatically changed since 2016, the PRODA ignores new information. The Feasibility Study ("FS")—the more detailed study that underlies the PRODA—relies exclusively on the 2012 Remedial Investigation ("RI") as support for its analysis of the

¹⁰⁷ Craig Lyons, *East Chicago Residents Urge EPA for Better Cleanup Plan for West Calumet Site*, CHICAGO TRIBUNE (Nov. 30, 2018) (quoting a founder of Calumet Lives Matter regarding the redevelopment of Zone 1, "Why is nothing being done in Zone 1?")

Zone 1 contamination. The FS and the PRODA fail to consider how the information gained in Amereco's 2017 Phase II Environmental Site Assessment of the WCHC should impact its analysis. This is a substantial omission considering that the Phase II report details extreme contamination at great depth and raises the need for further study to understand fully the scope of contamination. How could USEPA make a decision about the plan for the site without conducting the recommended additional investigation?

Not only does the PRODA neglect new information about the soil contamination, it also relies on the defective 2012 Human Health Risk Assessment ("HHRA") in the FS; HHRA did not incorporate representative soil samples from Zone 1 and evaluated exposure pathways based on a future use where existing residential structures would remain in place. Moreover, the PRODA or FS should have acknowledged that the Agency for Toxic Substances and Disease Registry's ("ATSDR") 2018 report *corrected* its 2011 report that included the erroneous conclusion that "[b]reathing the air, drinking tap water or playing in soil in neighborhoods near the USS Lead Site is not expected to harm people's health."¹⁰⁸ The 2018 ATSDR report concluded, instead, that children living on the USS Lead Site were up to three times as likely to have elevated blood lead levels as the rest of East Chicago.

This up-to-date and site specific information should have been considered when developing a new plan for Zone 1.

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¹⁰⁸ ATSDR 2018 Health Consultation, *supra* note 6, at 16-17.

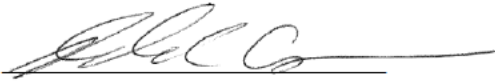
For the foregoing reasons, we urge USEPA to adopt Alternative 4D and finally promote environmental justice in this community.

Thank for you considering and responding to these comments. We welcome the opportunity to discuss them further.

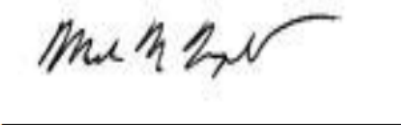
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CAG's Comments-Dupont Statement of Basis

March 12, 2018

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Re: Comments on DuPont, East Chicago (EPA ID IND 005 174 354) Statement of Basis

On behalf of the East Chicago Calumet Coalition Community Advisory Group (CAG), the Northwestern Pritzker Law Environmental Advocacy Clinic, the Abrams Environmental Law Clinic at the University of Chicago Law School, and the Hoosier Environmental Council (HEC), we submit these comments regarding the Statement of Basis (SB) for the 440-acre DuPont site located at 5215 Kennedy Avenue, East Chicago, Indiana. We want to acknowledge the contribution to these comments, in the form of technical support, provided by Colin Phillips, Ph.D., Postdoctoral Fellow, Department of Civil and Environmental Engineering, and Aaron Packman, Ph.D., Professor of Civil and Environmental Engineering, Northwestern University.

These comments reflect the point of view of the CAG member residents and focus on the groundwater contamination.¹ Many members of the CAG essentially live across the street from the DuPont property and have done so their entire lives or at least for several decades. The DuPont site is located directly south of the residential area of the USS Lead Superfund Site (USS Lead Site) Operable Unit 1; some homes in Zone 3 are approximately 200 feet from the DuPont site, and some homes in Zone 2 are within approximately 350 feet of the DuPont site.

The DuPont site's severe contamination and the migration of this contamination off-site into the residential area to the north and into the Grand Calumet River to the south² have been well known for at least 27 years, yet no effective remedy has been put

¹ Other community groups and/or allies of the CAG are submitting separate comments that provide important analysis of other problems with the SB and proposed remedy.

² The site has an east-west groundwater divide such that groundwater to the north of the divide flows north toward the adjacent residential area and the groundwater to the south of the divide

in place. Now, more than 20 years after the 1997 Corrective Action Order was issued, the draft SB proposes yet another incomplete and inadequately justified remedy; the SB itself is vague and relies heavily on underlying documents that do not support the conclusions for which they are referenced. Residents deserve better.

While it is urgent to begin implementing a remedy as soon as possible, DuPont and the United States Environmental Protection Agency (USEPA) should also update and improve the sump-pump studies and other groundwater testing in the residential area as well as more closely examine the air emissions, and take urgent action to protect residents from the imminent and substantial endangerment posed from the DuPont site contamination. Indeed, the DuPont site and the adjacent, contaminated USS Lead Site have languished for decades, and residents have been paying the price in terms of exposure to known toxins; residents must be protected as soon as possible.

I. Introduction

The DuPont site has been used to manufacture and dispose of a very long list of harmful chemicals. DuPont first began chemical and pesticide manufacturing in 1893 (sulfuric acid) and 1910 (lead arsenate insecticide). At least 270 acres of the 440-acre site have been used for chemical and pesticide manufacturing facilities or associated infrastructure, including 14,000 feet of abandoned process sewers, stormwater and sanitary sewers, and numerous toxic and hazardous waste disposal sites. Today, there is still at least one operational landfill on the property. Chemours recently announced plans to redevelop 155 acres of the site and use it for a logistics facility.³

It is difficult to understand why USEPA never added the DuPont site to the National Priorities List (NPL) under Superfund, despite having proposed it for the NPL in 1983, or why it was not included in the boundaries of the USS Lead Site. Instead, USEPA has relied on a Corrective Action Order (CAO) in 1997 to manage the property under RCRA. The CAO led to remedial efforts that have not protected the public health of the adjacent residential area.

The current proposed remediation plan set forth in the SB is highly unlikely to rectify those deficiencies. As detailed in the sections below:

- The SB inappropriately limits the groundwater contaminants of concern to arsenic⁴ when earlier studies indicated that zinc, chloride, sulfate, cadmium were also found in monitoring wells at the boundary separating DuPont and the residential area.
- The SB does not address the off-site groundwater contamination that occurs through basement seepage and contaminated sump-pump water even though

flows toward the Grand Calumet River where it discharges. SB, 7-8. The water table is very high in places at the site and in the greater area, and groundwater and surface water to come into contact with some frequency.

³ Greg Townsend Comments, USEPA Public Meeting; DuPont Statement of Basis, March 6, 2018.

⁴ Notably, the SB neither distinguishes between inorganic and organic arsenic nor does it consider the bioavailability of the different types of arsenic.

earlier studies showed levels of arsenic, zinc, sulfate and iron that exceeded the operable standards.

- The SB incorrectly assumes that residents have no contact with the contaminated groundwater, and that even if they do, the groundwater contamination will be addressed under a future, uncertain and currently unfunded cleanup plan for Operable Unit 2 (OU2) of the USS Lead Site.
- The on-site remediation steps are flawed and are unlikely to prevent the continued migration of contaminated groundwater to the residential area adjacent to the DuPont property, because they do not prevent the flow of arsenic-contaminated groundwater to the residential areas of the site.
- SB completely ignores any evaluation of potential air contamination even though the Phase I RFI Report documents a long list of contaminants of concern including arsenic, zinc, lead and more (DuPont Final Phase I RFI Report, Table 3-1) and the Human Health Risk Assessment (HHRA) identifies the existence of arsenic in the air at levels that exceed the risk-based screening levels for cancer. Human Health Risk Assessment (February 2012).

In sum, Alternative 4, the selected alternative, fails to protect human health and the environment, and USEPA has failed to explain or to justify its decision. Alternative 5 is the only alternative that USEPA deems would control off-site migration (SB, 68, Table 1); USEPA indicates that Alternative 5 would require multiple decades of groundwater extraction and that it is unlikely to achieve long-term groundwater clean-up goals. *Id.* Yet, while the SB rejects that alternative, it does not offer an alternative that accomplishes both control of off-site migration and long-term effectiveness. The SB process failed to generate the optimal solution.

USEPA Administrator Pruitt has stated that many contaminated sites, including USS Lead, have taken “far too long to remediate.”⁵ Administrator Pruitt has deemed the contamination in East Chicago a priority, and USEPA should take appropriate and expedient action under this RCRA Corrective Action; after twenty-one years since the initial Corrective Action Order, the residents cannot wait any longer for a safe place to live. USEPA should perform additional testing on the groundwater under “Riley Park” (the residential area adjacent to the DuPont site and also known as OU1 of the USS Lead Site), reconsider its exposure assumptions, reconsider the air pathway of exposure, revise the alternatives, and select a remedy that can move forward promptly and will be thoroughly protective of human health.

II. The SB Neglects the Serious Risks of Off-Site Groundwater Contamination.

The SB is flawed because it focuses almost exclusively on on-site risk to human health, while downplaying off-site harm to nearby residents caused by exposure to arsenic-contaminated groundwater. It relies on outdated data and makes unrealistic assumptions. In its description of the groundwater risks, the SB summarily states that

⁵ <http://www.foxnews.com/politics/2017/07/25/epa-task-force-recommends-speeding-up-long-languishing-cleanup-superfund-sites.html>.

Riley Park residents⁶ are connected to the East Chicago public water supply and do not get potable water from any residential wells. Previous RCRA investigations found no unacceptable risks to the Riley Park residents from exposure to groundwater in sumps. Further, as part of the investigation of the USS Lead Superfund site, EPA is investigating the groundwater north of the DuPont facility and, if necessary to protect human health and the environment, will take or require a responsible party to take appropriate response actions.

SB, 8. With these three sentences (and no discussion of air impacts), USEPA absolves itself of any further consideration of the off-site harm posed by this site. Yet, a closer look reveals that this reasoning is problematic and unsupported by past investigations or underlying documents referenced in the SB.

A. Groundwater data used in the SB is outdated and inadequate.

The SB's assessment of human health risks is based largely on the February 2012 Human Health Risk Assessment (HHRA), which relies on flawed older studies. The HHRA, prepared by a DuPont-hired contractor, summarily concluded that "there are no unacceptable exposures associated with constituents in groundwater at Riley Park"—the residential properties in OU1 of the USS Lead Site. HHRA at Executive Summary (ES)-4, (February 2012). However, in the previous page, hidden in a footnote to a chart, the HHRA states:

4. The cancer risk (based on the assumption that Site perimeter groundwater constituent concentrations are present in basement sumps and that people are regularly contacting the groundwater) was greater than $1.0E-06$.⁷ However, these results are consistent with the previous Environmental Indicator Determination Report: Current Human Exposures Under Control (CA725), (DuPont CRG 2004) evaluation, which *concluded that the pathway is not significant based on several lines of evidence*.

ES-3 (emphasis added). To reconcile these contradictory statements, the HHRA dismisses this impermissible cancer risk by reference to "several lines of evidence." These lines of evidence actually represent assumptions that have been repeated—without analysis—since 2004.

The CA725—on which the HHRA rests (*see* HHRA at ES-6)—relies on the flawed and outdated 1990 and 1992 groundwater assessments, a few additional samples in 1999-2000, and a very limited sampling of the northern boundary and the sump-pump water in the basements of four homes in 2004. *See* Report: Current Human Exposures under Control (CA725), 4-1 (Dkt. 938602) (DuPont CRG 2004). USEPA used this

⁶ Residents living in OU1 of the USS Lead Site.

⁷ Cancer risk is expressed as a probability. USEPA generally aims to reduce the increased risk of cancer to the range of 1 in 10,000 to 1 in 1,000,000. In this situation, it seems that USEPA has indicated that it has applied a risk range of 1 in 100,000 or $1.0E-05$; because the narrative description does not match the numeric description, there may be a typographical error. SB, 6-7.

outdated and inadequate data set and fails (a) to explain how its data supports its conclusions, (b) to address more recent and robust data that shows potential exposure, and (c) to consider how groundwater flow and conditions have changed due to continual sump-pump use and sewer-system issues, likely pulling the arsenic plume toward the residential area.

We discuss the substance of the past sump-pump studies in greater detail below, but it is important to note the process problems here. USEPA has conducted only one study of sump-pump water in 2004, and that study examined only four houses.

Other studies, not considered by USEPA, demonstrate contamination problems. First, in 2007, a study of six homes commissioned by the City of East Chicago concluded that arsenic was present in levels above the operable standard⁸ in virtually every sample. The 2007 study is a red flag that a greater investigation of the off-site contamination is needed, but that DuPont, its contractors, and USEPA have ignored that red flag. At that time, the City of East Chicago wrote to USEPA, saying:

We have noted the DuPont East Chicago facility . . . has undertaken corrective action due to groundwater contamination, including elevated levels of arsenic . . . We understand that DuPont has undertaken corrective action with respect to the groundwater contamination, including the installation of a permeable reactive barrier to prevent contaminants from migrating off-site. However, based on the sampling we have conducted on Ivy Street, we are concerned the implemented corrective action is no longer preventing contaminant migration.

In order to protect the health and welfare of our citizens, we are formally requesting an investigation by USEPA Region 5 into the extent of contaminant migration in the area and possible remedial actions necessary to remove the contaminated groundwater and prevent exposure of the residents to arsenic. Moreover, we are requesting your assistance in the best possible way to inform our citizens of the identified groundwater contamination.

Letter from Alfonso Velez, Utilities Director, East Chicago to Mr. Brian Freeman, USEPA, August 21, 2007, at 2. We have seen no evidence that the HHRA evaluated the data from the City's 2007 study or the concerns expressed by the City of East Chicago, and the Administrative Record for this SB did not even include this information until we raised concerns with USEPA about it. Second, in 2012, Parsons performed a supplemental groundwater sampling plan that was specifically designed to discern the limits of the plume at the northern boundary. *See* Parsons Groundwater Evaluation, March 2013 (Dkt. 938074). This data provides more comprehensive testing of the northern boundary but there is no evidence that it has been considered to date. The Parsons 2012 Supplemental Groundwater study found that arsenic was found north of the permeable reactive barrier (PRB), which means that it continues to migrate to the

⁸ USEPA has indicated that it applies the drinking water standard, expressed as the maximum contaminant level (MCL), even though the groundwater is not a source of drinking water. The MCL standard for arsenic is 10 micrograms per liter.

adjacent residential area. This data provides more comprehensive testing to the northern boundary and found migration of contamination, but there's no evidence that this study has been considered.

USEPA's reliance on historic data is also problematic in this situation where the groundwater flow is changeable and poorly understood. Throughout the RCRA action, USEPA has noted that the continual sump-pump use and other sewer system issues have altered groundwater flow. *See, e.g.,* Phase I RFI at 1.4 (Dkt. 938060). EPA's present theory of groundwater flow is based on a 1997 report, but the changing conditions of sewers and increase or decrease in sump-pump use may have changed this flow in the intervening period.

The SB does nothing to explain why the past RCRA investigations support its conclusions, especially when other studies showed elevated levels of arsenic in residential area groundwater. In sum, the SB is essentially a house of cards that falls due to problems with the initial studies on which subsequent analyses and the SB are based.

Given these conditions, USEPA should gather more data on the groundwater at and beyond the northern boundary of the facility, including within the adjacent residential areas. At the very least, USEPA should revisit the HHRA and SB and address the City of East Chicago's 2007 sump-pump testing in the residential area, before deciding on a proposed corrective action remedy. That said, USEPA needs to move expeditiously in this regard so that additional fact gathering does not slow implementing an effective remedy to protect public health immediately.

B. The SB inappropriately downplays the USS Lead Site residents' likely exposure to the contaminated groundwater.

Beyond the SB's reliance on outdated and incomplete studies, the SB's substantive analysis of the off-site contamination does not hold water. The entire justification for the selected remedy's disregard for the known off-site harms seems to rest on mistaken assumptions about the residents' exposure to the arsenic-contaminated groundwater. This lack of attention to the protection of human health is particularly concerning here when (a) the 1997 Corrective Action Order contemplated that DuPont would monitor and remediate off-site groundwater contamination, (b) nobody disputes that contaminated groundwater is reaching the residential area, (c) studies have shown pathways for exposure, and (d) the residents in this environmental justice community have been exposed to arsenic through multiple pathways for decades.

1. Existing studies show arsenic levels that exceed the operable standard.

The existing data supports the conclusion that residents' exposure is a concern, contrary to the assertions in the SB. In 2004, USEPA took water samples from the sumps and yards of four residences in the southern portion of the residential area, houses located on Ivy, Grasselli, and Euclid, and between 149th and Street and 149th Place, properties that are now included in OU1 of the USS Lead Site. *See* 1/20/2005 USEPA Ltr. to Residents re Sump and Soil Sampling. USEPA found in every sump pump arsenic

concentrations in groundwater that exceeded the 10 micrograms per liter maximum concentration level (MCL) drinking water standard, which is the standard it deemed applicable.

2. USEPA incorrectly assumes that residents are not exposed to the sump-pump water.

Despite finding contamination in the sump study, USEPA opined that these results were not a problem because the residents did not drink the water. That conclusion begs the question: Considering that USEPA knew then that the residents did not drink the groundwater before conducting the tests, why did it deem the sump-pump testing appropriate?

The obvious answer: Even if contaminated groundwater is not the source of residents' drinking water, residents were and continue to be exposed to the contaminated groundwater in several other ways. Indeed, at some point, USEPA must have recognized the other sources of exposure because it tested the soil where the sump-pumps discharged the contaminated groundwater;⁹ as discussed below, these soil results were questionable at best.

While USEPA justifies ignoring the arsenic-contaminated groundwater in the residential area based on the "line of evidence" that the residents have only limited contact with their sump-pump water, it ignores the fact that almost all of the basements have seepage or flooding, even if some of them have sump pumps. The largest effort to understand the residents' exposure to arsenic-contaminated groundwater was done in 1990; at that time, 450 residents were approached with questionnaires about their potential contact with groundwater—either through the use of wells or basement flooding. Of the 369 that responded in 1990, 32 indicated that they had problems with basement flooding, 30 of those residents used sumps pumps, and 11 of the residents who used sump pumps still had flooding. See Appendix G, 1992 Phase II Groundwater Report, 255.

USEPA has already determined in the context of the investigating indoor contamination at the USS Lead Site that the residue from basement flooding contains high levels of arsenic and lead. Residents are exposed to the groundwater contamination through basement flooding and residual matter from flooding. Because the water table is very high, this flooding or use of sump pumps is a daily occurrence here. USEPA's theory of "limited exposure" does not reflect the reality on the ground here. Moreover, USEPA's assumptions place the onus for limiting exposure on the residents exposed to groundwater rather than the owner of a facility subject to the RCRA Corrective Action.

⁹ The facts regarding sump-pump usage and discharge have also changed over time. In 1991, it seems that many sump pumps may have been discharging to the sewer and USEPA relied on that fact to support its conclusion that residents were not exposed to the groundwater. See Current Conditions Report for DuPont East Chicago Facility, Volume 2, Book 2, 34 (CH2MHill 1991). Yet, by the time USEPA was testing the soil near the sump-pump discharge sites in 2004, residents were no longer permitted to discharge sump pumps into the sewer.

The flawed “limited exposure” theory comes from the RFI and references a hypothetical assessment done by DuPont; it does not reflect the reality on the ground. The Revised Human Health Baseline Risk Assessment attached to the RFI states:

[I]t was assumed that residents (both adults and children) could contact the sump water for a two-hour period, ten times each year, over their entire lifetime. It also was assumed that the residents would be exposed by dermal contact with, and incidental ingestion of, the sump water. Inhalation was not considered, as the only constituents of interest in this groundwater plume are metals, which are non-volatile.

After going through this exercise, it was determined that the incremental cancer risks associated with exposure to sump water (assuming that they contained perimeter well levels of metals) would fall within USEPA’s acceptable risk range of 1×10^{-4} to 1×10^{-6} , and would have hazard indices less than 1.0. These results are shown in attached Table 12, and the supporting calculations are shown in Appendix B. As a result of this evaluation coupled with current sump water data, risk associated with exposure of residents to basement sump water is considered to be insignificant.

Phase II RFI (Dkt. 938061). This hypothetical does not reflect current conditions at the site. Currently, the water table is close enough to the surface in the residential area that residents with sump pumps report that the many pumps are working all day every day; for residents without sump pumps, their basements are flooding or experiencing seepage regularly. It also does not address the residents’ exposure to the residual dust left behind from flood events or to the soil contaminated by the discharge of sump-pump water onto their yards.

In fact, USEPA’s small sample sump-pump 2004 testing found that the soil onto which the sump discharged had elevated arsenic levels. While USEPA concluded that arsenic contamination did not result from the sump water because elevated levels of arsenic were also present in soil where the sump pumps did not discharge, that analysis was flawed and problematic then and is no longer relevant today. First, in 2004, USEPA knew or should have known that these residential yards were likely contaminated with variable levels of arsenic due to other sources of contamination; therefore it should not have drawn conclusions about the impact of the sump-pump water because of the variability of the levels of arsenic contamination at each of these properties. In other words, because of variability, there was no standard “baseline” for background conditions, so the analysis was flawed.¹⁰ Second, no attempt was made to understand the migration of sump-pump discharge to determine whether testing away from the point of discharge may reflect the migration of past sump-pump discharge. Moreover, these high

¹⁰ Little information was provided as to other areas of East Chicago that were tested for background levels of arsenic. Without further information, it is difficult to assess whether those were legitimate selections.

levels of arsenic still posed a threat to the residents, and that was not considered or addressed.

To this very moment, sump pumps continue to discharge contaminated water onto residents' soil—even the clean soil that USEPA has used to replace and cover contaminated soil in these yards. USEPA plans to continue this work throughout OU1 over the next two years. Yet, the contaminated sump-pump water threatens the integrity of the CERCLA cleanup and the health of the residents.

For all of these reasons, as soon as possible, USEPA should perform additional sump testing at the homes with cleaned yards north of DuPont to determine whether the sump pumps are re-contaminating the CERCLA-remediated properties in OU1.

3. USEPA inappropriately assumes that the sewer system will intercept the contaminated groundwater and protect human health.

The 2012 HHRA and the 2004 CA725 and CA750 evaluations of the off-site risks downplay the risk to the residential area, particularly to the north of 149th Street, based on the unproven assumption that the sewer system intercepts the arsenic plume. See Environmental Indicator Determination Report Migration of Contaminated Groundwater Under Control (CA 750) DuPont East Chicago, East Chicago, Indiana, 11, 13 (2004). Specifically, the CA750 notes that the “Riley Park” sewers and sumps create a groundwater depression that draws the arsenic moving north from DuPont. *Id.* This theory ignores the facts that dozens and dozens of homes sit between the DuPont site and the 149th Street sewer, and there has not been any recent testing north of the sewer system. Moreover, because the integrity of the sewer system is questionable, it may be leaking contaminated water, at various points along the sewer line, into the surrounding soil and high water table and contributing to recontamination or contamination of the soil. Still, throughout the entire RFI process, USEPA has repeated this theory that appears to undergird the SB's conclusion.

First, USEPA relies too heavily on a likely weak and failing sewer system as a key component of the RCRA Corrective Action. RCRA Corrective Actions that rely on limiting exposure, must consider engineering and institutional limitations. *See* Advanced Notice of Proposed Rulemaking, 61 Fed. Reg. 19432,19449 (noting that “all things being equal, permanent reductions in toxicity, mobility or volume are preferred to exposure control because it is protective of human health and the environment in the long-term and removes the risks associated with the potential failure of engineering or institutional controls.”) Nowhere in the HHRA or other reports are the potential failings of these structures considered.

Second, the sewer intercept approach poses additional dangers. In a heavy rain event, the sewer will discharge arsenic-contaminated groundwater via downstream leaks into other parts of East Chicago and the Grand Calumet River. Rather than supporting inaction at the northern boundary of DuPont, the sewer- and sump-created groundwater depression actually spreads the problem in the community. DuPont or USEPA should undertake more testing to understand these dynamics.

Under RCRA, DuPont, not old sewer pipes, should take away the arsenic-contaminated groundwater threatening the residents in the adjacent neighborhood. USEPA should not rely as heavily as it does on leaky sewers as part of its SB and proposed remedy.

III. The SB Inappropriately Shifts Responsibility for the Off-Site Groundwater Remediation to the USS Lead Site Superfund Cleanup.

The SB puts its faith in—and asks the residents to put their faith in—the USS Lead CERCLA remedial action: “Further, as part of the investigation of the USS Lead Superfund site, USEPA is investigating the groundwater north of the DuPont facility and, if necessary to protect human health and the environment, will take or will require a responsible party to take appropriate response actions.” SB at 8. This single sentence does not provide comfort considering the decades-long contamination facing residents and the uncertainty surrounding the referenced CERCLA remediation.

As a preliminary matter, the decision to hand off the residential groundwater contamination, known to be associated with DuPont’s operations covered by the RCRA Corrective Action Order, contradicts prior actions by USEPA. The operative Corrective Action Order contemplates that DuPont will monitor and remediate residential groundwater contamination. CAO, 44. No past remedial efforts at the DuPont Site have successfully addressed the migration of contaminated groundwater.

An analysis of the timing, legal enforceability, and integrity of the cleanup actions shows that a RCRA cleanup is potentially more appropriate for addressing the contaminated groundwater under the residential area than a CERCLA cleanup—or at least that USEPA should not forego using its tools under RCRA to bring about corrective action for the off-site groundwater problems, given the present uncertainty of the CERCLA remedy. The SB should not abdicate responsibility for the off-site groundwater contamination because there exists no other binding legal order or settlement to compel the groundwater contamination cleanup. Moreover, the investigation of the groundwater contamination in the adjacent residential area is in the preliminary stages and will not happen for more than three years, while the activities governed by this SB are expected to begin within the next year. Meanwhile, action is needed immediately to protect human health and the environment in OU1 of the USS Lead Site; the sump pumps continue to discharge contaminated groundwater to soil that has already been or will be remediated.

While DuPont may raise concerns about the potential duplication of efforts and increased costs, USEPA should be able to coordinate the efforts in a way that protects public health and the environment while harmonizing the different studies and efforts. The default should not be a plan that preferences cost reduction over prompt protection of public health.

At a minimum, USEPA must pragmatically consider and explain which program is the best fit for the contaminated groundwater cleanup. The SB and Administrative Record for the USS Lead Superfund Site contains no such analysis.

A. The pending USS Lead Site remediation has no legally enforceable settlement that compels groundwater remediation.

As of today, there is no legally-required plan—and not even a proposed one—for remediating the groundwater associated with the USS Lead Site Operable Unit 2 on which the SB could rely. The 2012 Record of Decision and the 2014 Consent Decree for Operable Unit 1 of the USS Lead Site expressly state that groundwater will be considered under the cleanup for Operable Unit 2 (OU2). However, USS Lead and its parent companies—not DuPont—have agreed only to conduct the Remedial Investigation and Feasibility Study (RI/FS); USS Lead and its parent companies have not agreed to remediate the groundwater.

Meanwhile, USEPA has an outstanding Corrective Action Order to compel DuPont to clean up the contaminated groundwater. By deferring to the USS Lead Site Remediation, USEPA trades a legally enforceable corrective action order against a financially-solvent company in the present for the uncertain hope of remediation down the line. USEPA's hope rests on the specious premise that the CERCLA PRPs will promptly, and without argument, participate in an adequate groundwater cleanup. U.S. Metals Refining, the parent company of USS Lead, already has challenged other administrative orders at the USS Lead Site based on the argument that it is not liable under CERCLA. *See* Letter from Gallagher and Kennedy to EPA, 1/18/2018, dkt. 939035 in USS Lead Superfund Site Administrative Record. And, USS Lead has expressed its limited financial capacity.

The 1997 Corrective Action Order obligates DuPont to pay for the groundwater cleanup and presumes that DuPont will address off-site contamination. As of now, under RCRA, DuPont has not and cannot argue that someone else is responsible for the arsenic plume in the adjacent residential area. But in light of the ongoing and adjacent CERCLA action, DuPont has an interest in shifting the groundwater cleanup to the CERCLA action; if the plume is considered as part of the USS Lead Site, DuPont can share the costs and responsibility with the other polluters. Nonetheless, USEPA presently has the legal authority to compel a cleanup of the arsenic plume under RCRA. It should not abandon this strong position by deferring the groundwater remediation to CERCLA.

B. Deferring the cleanup to CERCLA means continued delays at the expense of residents and property owners.

EPA should not defer a facility where the RCRA corrective action has reached the remedy stage to a CERCLA action that has not yet begun its RI/FS. Instead, USEPA/DuPont should do additional testing in OU1, while it takes interim measures to prevent further migration of the arsenic groundwater plume. Once the residential testing is complete, USEPA and DuPont can promptly begin remediation, perhaps within the year.

Contrast this with USEPA's timeline for OU2 of the USS Lead Superfund site, which will include the groundwater under OU1. As of today, the Administrative Record at the USS Smelter site does not contain a single groundwater study. The RI/FS for OU2

is currently in the form of a “Draft Work Plan.” At best, the RI/FS will take 24 to 36 months to complete. Unlike the RCRA action, this OU2 RI/FS covers a much larger area with more complex conditions. USEPA has not yet studied any of these factors. In addition, OU2 remedy requires USEPA to secure funds that will delay the cleanup even longer; even when the RI/FS and the Record of Decision is complete, in 2020 or 2021, USEPA will most likely will not proceed with cleanup activity until it secures funds through a settlement with the polluters. This means that residents will be waiting at least until 2022 to see the beginning of cleanup of known, arsenic-laced groundwater that flows from the DuPont facility into their basements, sump pumps, and yards.

C. The ongoing sump-pump discharge to OU1 soil threatens the integrity of the USS Lead Site cleanup.

USEPA is legally mandated to preserve and protect its soil remediation of USS Lead Site OU1. CERCLA requires USEPA to develop a remedial plan that protects public health and the environment and expects USEPA to “utilize permanent solutions” and consider “the potential for future remedial costs if the alternative remedial action fails.” 42 USC § 9621(b) (1). The National Contingency Plan (NCP) further states that the “national goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, . . .” 40 C.F.R. § 300.430(i)(a). These central statutory and regulatory considerations make evident that USEPA has an obligation to protect the integrity of its cleanup.

But the SB fails to uphold that obligation because sump-pump discharges will contaminate the soil that USEPA replaced and remediated. It is undisputed that sump-pump water is contaminated and discharged onto OU1 yards—either contaminating or re-contaminating these yards on a regular basis. In addition, the existence of a leaky sewer system, discussed above, means that contaminated groundwater that is captured by the sewer system may also be leaking back into soil in the area.¹¹ USEPA has failed to date to take any other immediate action to protect the soil in OU1. USEPA’s inaction in the face of this threat contravenes the mandate to “maintain protection over time.” 40 C.F.R. § 300.430. And it threatens the integrity of the ongoing CERCLA soil remediation at the USS Lead Site and ultimately perpetuates the imminent and substantial endangerment of the residents.

IV. The Interim Measures Have Failed, and the Proposed Remedy Also Will Likely Fail.

A. Over many decades, no remedial efforts have prevented contaminated groundwater from migrating to the residential neighborhood adjacent to the DuPont site.

The PRB has not prevented contamination from migrating off-site. In the 2015 Corrective Measures Study (CMS), DuPont contractor Parsons described the “effectiveness” of the PRB as “limited.” Corrective Measures Study, 43 (Parsons, 2015).

¹¹ In heavy rain events, sewage overflow could lead the contaminated groundwater to flow directly into the Calumet River from the overloaded sewage system.

The CMS looks to the Parsons 2012 Supplemental Groundwater study, which found that arsenic was overtopping the PRB and leaching from soil north of the PRB. In addition to the Parsons reports, other evidence exists that the PRB has been ineffective. In 2007, the City of East Chicago tested sump-pump water in the residential area to the north of the DuPont site; these studies demonstrate that, even after the PRB was installed in 2002, there have been continued concerns about the levels of arsenic in the groundwater. At that time, the City of East Chicago contacted USEPA and requested further investigation.

Despite this dismal review of the PRB's effectiveness, the SB's selected remedy largely relies on the PRB—with some relatively minor and likely ineffective tweaks—to prevent continued migration of the existing arsenic plume. As discussed below, the proposed remedy must be modified to ensure that it protects human health and the environment, including the adjacent residential community.

B. The proposed on-site remedial action is inadequate.

The SB fails to demonstrate that the proposed on-site remedial action will effectively protect human health and the environment.¹² The proposed remedy neither addresses all of the existing on-site groundwater contamination nor prevents further off-site groundwater contamination. The SB completely fails to address potential air emissions stemming from contaminated soil particles transported by wind to cause on- and off-site exposure.

1. Groundwater contamination will likely persist under the proposed plan.

- a. The proposed plan does not address on-site groundwater contamination north of the PRB.

The SB ignores the fact that contamination exists on-site and on the north side of the PRB. The PRB is not located at the property line, and significant amounts of contaminated soil and groundwater exist north of it, within the DuPont site boundaries. The SB does not explain if, or how, this contamination will be addressed. At a minimum, USEPA and DuPont must revisit the plan for preventing the existing contaminated groundwater from migrating off-site and for addressing contamination north of the PRB.

- b. The on-site groundwater contamination south of the PRB can continue to migrate north and off-site.

It appears that the existing PRB—with some iron supplements and other modest modifications—near the northern edge of the DuPont site would remain the sole remedy for the northward migration of groundwater into the Calumet neighborhoods. Even

¹² Individual community members and allies plan to submit detailed comments regarding the failings of the proposed on-site actions.

though it is undisputed that the PRB has failed since its original construction in 2002, the SB does not provide sufficient evidence that these changes will make the PRB effective.¹³

Even if the modified PRB turned out to be somewhat effective, the SB does not consider ways in which the groundwater can migrate around the PRB and avoid treatment. For example, water can continue to migrate over the top of the PRB during rainy periods, or underneath at any time—especially considering the depth of the plume.¹⁴ In addition, it is possible for the contaminated plume to migrate around the PRB wall to the East. Yet the SB does not seem to consider or take action to address any of these risks to human health or the environment.

c. The proposed plan relies heavily on an unproven technology.

Rather than curing the flawed PRB, the SB seems to bet heavily on “microbial sulfate reduction” as the method for dealing with arsenic-contaminated groundwater. SB, 2-3. In light of the toxic soup of contaminants at this site, it is critical that the effectiveness of this method be proven and monitored during its implementation. Although USEPA stated, at its March 6, 2018 public meeting, that there have been pilot tests of this technology at the site, that information is not incorporated or explained in the SB. Moreover, the SB indicates that the sulfate injection wells will be used in limited areas of the site and will not address the contamination to the north of the PRB or under existing paved roads or parking lots.

d. The SB offers no interim protection to human health even though it acknowledges that it cannot meet the operable arsenic standard for at least five years.

The SB has set the long-term goal for groundwater quality at the facility boundary as the drinking water standard, maximum concentration level (MCL) for arsenic—10 micrograms per liter. *See* SB at 10. We appreciate that USEPA has chosen the drinking water standard, and not one which is more lax. However, by its own admission this standard cannot be met at the DuPont boundary in the short term. USEPA indicates that it expects to meet that goal in the long-term, an undefined amount of time. But, it will not test the groundwater in the adjacent residential area to assess whether the standard has been met.

Even if we could accept the USEPA’s unusual decision to ignore off-site contamination due to an unrelated cleanup action under an entirely different set of authorities, the contamination within the DuPont site itself must be addressed; the SB fails to justify that keeping the PRB in place, or relying on an unproven technology, will protect human health and the environment expeditiously.

¹³ The SB’s primary discussion of a groundwater barrier relates to blocking the southward migration of contaminated groundwater to the Grand Calumet. SB, 2-3. While preventing southward migration is also critical, it is not sufficient.

¹⁴ See Parsons Technical Memorandum-Remedial Technology Screening Evaluation, DuPont East Chicago Site, September 13, 2013, Figures 6-8 (Dkt. 938052).

2. Moving contaminated soil closer to the residents is inappropriate.

The selected remedy entails moving approximately 14,000 cubic yards of contaminated soil to the on-site landfill. SB at 2. The landfill is located in close proximity to the residential neighbors. The SB indicates that this soil will be treated to stabilize the arsenic prior to its management in on-site landfills. SB, 17. However, the SB does not indicate how it will address other contaminants of concern in this contaminated soil. Nor does it provide sufficient explanation in support of the proposition that this technique will work. USEPA has not done enough to demonstrate that the arsenic contaminated soil will not continue to leach into the groundwater, and reach the residential area even more quickly than before.

Although USEPA recently made an effort to explain that the DuPont facility is being regulated under the RCRA,¹⁵ and points to the 1997 CAO as the operative regulatory tool, it has not explained how the on-site landfill is regulated under RCRA. This gap is striking considering that USEPA has proposed a plan to manage contaminated soil at this landfill. The SB has not indicated whether the landfill has liners and whether they have been properly maintained; USEPA has not provided any information to show that landfill is sound and not leaching. The on-site landfill hardly seems appropriate, considering it sits on unstable soil that is often saturated with water. Residents are concerned that USEPA is endorsing a plan to bring the contamination closer to them without sufficient proof that they will be protected from it.

3. Air emissions must be considered and addressed.

The SB omits virtually any discussion of air pathway of exposure. It does not consider existing risk or evaluate the risk associated with the proposed alternatives. The SB simply ignores the potential exposure to people on- or off-site that could occur from the transport of soil particles by air, even though it has been known for many years that there are several contaminants of concern for air exposure. See DuPont Final Phase I RFI Report, Table 3-1. Moreover, the underlying 2012 HHRA acknowledges that “[a]verage arsenic concentrations for all locations were greater than the cancer-based RSL.”¹⁶ Human Health Risk Assessment – East Chicago, 5-6 (February 2012). The HHRA summarily dismisses this serious concern by saying that “the average measured arsenic concentrations were less than the range of arsenic concentrations reported by the ATSDR to be present in urban air.” *Id.* This conclusion requires significantly more explanation and analysis. If the goal is to protect human health in this environmental justice community, USEPA must justify a decision to ignore a cancer risk solely on the basis that there may be other sources of risk in this community.

¹⁵ See USEPA, RCRA Regulation of the DuPont/Chemours East Chicago Facility (February 21, 2018), available at https://www.epa.gov/sites/production/files/2018-02/documents/rcra-regulation-of-the-dupont-facility-explanation02-21-18_.pdf Note that the basic requirements that DuPont have fencing and warning signs have not been adequately implemented at this site, which does not have appropriate signage and had holes in its fencing until recently. See 40 C.F.R. § 264.14.

¹⁶ RSL is risk-based screening level.

The HHRA appears to rely on a flawed technical memorandum discussing the Summary of Air Monitoring Results. The Technical Memorandum states that it aims to “assess the potential for metal bearing soil particles to become airborne during strong wind conditions.” Technical Memorandum, From Parsons to Sathya Yalvigi, 1 (March 3, 2011). However, Parsons does not indicate whether its sampling was done under a range of conditions to ensure that it considered the impact of strong wind conditions. Instead, Parsons seems to have only taken samples over a three-week period from September to October 2010 and the testing was not continuous during that time. Even during that three-week period, the wind direction and speed was variable. *Id.* Wind conditions vary significantly based on the season and must be considered before USEPA can conclude that air emissions from the DuPont site are not a concern. Similarly, the HHRA relies on the Parsons’ work to conclude that downwind concentrations did not exceed significantly upwind concentrations; it is unclear whether the short sampling period and small number of air monitors support this result.

Ironically, in describing the benefits of disposing of managing the contaminated soil on-site instead of transferring the contaminated soil off-site, the SB references the reduction in possible emissions with this approach. SB, 18. This sentence belies what appears to be USEPA’s assumption that air emissions are not a relevant issue at this site.

Considering that DuPont will be removing and moving tremendous amounts of soil at the site, on the order of 61,780 cubic yards of highly contaminated soil, and moving 14,000 cubic yards of highly contaminated soil closer to the adjacent residential area, it is vital that USEPA evaluate more rigorously the existing air pathway and incorporate this explanation into the SB. The SB must evaluate the air emissions and examine the different alternatives in light of the air emissions.

V. Recommendations and Conclusion

The time to correct this flawed DuPont site corrective action is now. Residents living adjacent to the DuPont site have been exposed to toxins for far too long. The final proposed plan must do better to protect residents. As it stands, it does not address off-site contamination, seems to ignore on-site contamination on the northern boundary, and generally provides an incomplete and uncertain remedy for the on-site contamination. The proposed plan ignores the air pathway of contamination even though it involves substantial movement of highly contaminated soil.

Based on these concerns about the proposed remedy, we urge USEPA to undertake the following actions in furtherance of a RCRA proposed plan that protects human health and the environment:

Groundwater Contamination:

- Off-site:
 - Perform as soon as possible additional sump-pump testing at the OUI homes with cleaned yards just to the north of the DuPont site to determine whether the sump pumps are re-contaminating the

CERCLA-remediated properties. Undertake additional testing to the north of 149th Street to test its theory that the sewer is intercepting all of the contaminated groundwater.

- Develop interim measures as soon as possible to protect residents from imminent and substantial endangerment and the threat to the integrity of the USS Lead Site Superfund remedy, posed by the contaminated groundwater that enters residents' homes and/or yards.
- On-site:
 - Develop a plan for the on-site contaminated groundwater north of the PRB.
 - Revisit its heavy reliance on the faulty PRB as the primary method to prevent the arsenic groundwater plume from migrating northward.
 - At a minimum, modify the plan to prevent groundwater contamination from migrating underneath, around or on top of the PRB wall.
 - Install monitoring wells in the adjacent residential area and regularly monitor the wells to assess the effectiveness of the remedy as it is implemented.
 - Assess more thoroughly whether the proposed plan's on-site management of any excavated contaminated soil is protective of human health and the environment—including an assessment of the integrity of the existing landfill and the all contaminants present in the excavated soil.
 - Consider more protective alternatives to on-site management to ensure the protection of the nearby residents.

Air:

- Evaluate more rigorously and explain the existing air pathway of exposure.
- Consider the air emissions associated with each proposed alternative.
- Employ all measures possible to understand, monitor and reduce the risk to the community during the corrective action.

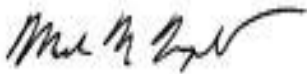
Thank for you considering and responding to these comments. We welcome the opportunity to discuss further any of these recommendations.

Sincerely,

The East Chicago Calumet Coalition Community Advisory Group
USS Lead Superfund Site
P.O. Box 2321
East Chicago, IN 46312



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FOIA EPA-R5-2022-005742



FOIA EPA-R5-2022-005742

EPA sent all dust samples to a laboratory for analysis. The dust samples are processed to select the fine dust that is the primary concern for exposure. The table below shows the concentrations of lead and arsenic in the fine dust.

EPA Dust Sample Results

Location	Lead concentration in fine dust (ppm)	Lead Screening level in fine dust (ppm)	Arsenic concentration in fine dust (ppm)	Arsenic screening level in fine dust (ppm)
Front Entry	59	316	2.1	26
Rear Entry	75		2.9	
Living Room	34		1.2	
Downstairs Bedroom	23		1.1	
Upstairs Bedroom	33		0.99	
Basement Entry	93		3.2	
Basement	920		17	

The results indicate levels above EPA health screening levels in your home. EPA is most concerned about the exposure of young children, so the sample results were compared to the EPA screening levels that are protective of exposure to children.

NAME	DATE	Comments
Prepared/Completed by: Alisha Chugh	07/18/2019 07/24/2019	
Reviewed by: Bakari Baker	02/18/20	[X]: I reviewed this WP and found it satisfactory. (No comments were provided.) [: I reviewed this WP and found it satisfactory. I also included comments in a dark red colored font. [: All comments have been resolved.
Edited by: Bakari Baker	5/5/20	Added CAG Organization Info

Title: Review of Written Comments Received to OIG.RiskCommunicationTeam Email Regarding USS Lead Superfund/East Chicago Site

Purpose: To document the emails and files received at the OIG Risk Communication Team email (OIG.RiskCommunicationTeam@epa.gov) for the USS Lead Superfund East Chicago site.

Project Guide Step #: 44

Source(s):

#	Description/Title	Source Document
1	<p>File 1 –</p> <p>Titled: 7.10.19FinalLetterCAGtoOIG_USS Lead Site.pdf</p> <p>Email Received By: Deborah Gail (Musiker) Chizewer Received On: 07/10/19</p>	<p>Link: F.11 - [IP] East Chicago-OIG Risk Com Team Email Analysis - [Source #1] 7.10.19FinalLetterCAGtoOIG_USS Lead Site.pdf</p>
2	<p>File 2 –</p> <p>Titled: 2019.07.10 Motion to Intervene Briefing.pdf</p> <p>Email Received By: Deborah Gail (Musiker) Chizewer Received On: 07/10/19</p>	<p>Link: F.11 - [IP] East Chicago-OIG Risk Com Team Email Analysis - [Source #2] 2019.07.10 Motion to Intervene Briefing.pdf</p>
3	<p>File 3 –</p> <p>Titled: 2019.07.10 ATSDR Reports.pdf</p> <p>Email Received By: Deborah Gail (Musiker) Chizewer Received On: 07/10/19</p>	<p>Link: F.11 - [IP] East Chicago-OIG Risk Com Team Email Analysis - [Source #3] 2019.07.10 ATSDR Reports.pdf</p>
4	<p>File 4 –</p> <p>Titled: 2019.07.10 CAG Letter to EPA re Interior Dust.pdf</p> <p>Email Received By: Deborah Gail (Musiker) Chizewer Received On: 07/10/19</p>	<p>Link: F.11 - [IP] East Chicago-OIG Risk Com Team Email Analysis - [Source #4] 2019.07.10 CAG Letter to EPA re Interior Dust.pdf</p>
5	<p>File 5 –</p> <p>Titled: 2019.07.10 CAG's Zone 1 Comments.pdf</p> <p>Email Received By: Deborah Gail (Musiker) Chizewer Received On: 07/10/19</p>	<p>Link: F.11 - [IP] East Chicago-OIG Risk Com Team Email Analysis - [Source #5] 2019.07.10 CAG's Zone 1 Comments.pdf</p>
6	<p>File 6 –</p> <p>Titled: 2019.07.10 CAG's Comments-DuPont Statement of Basis.pdf</p> <p>Email Received By: Deborah Gail (Musiker) Chizewer Received On: 07/10/19</p>	<p>Link: F.11 - [IP] East Chicago-OIG Risk Com Team Email Analysis - [Source #6] 2019.07.10 CAG's Comments-DuPont Statement of Basis.pdf</p>

7	<p>Email from Deborah Gail Musiker to OIG Risk Communication Team Email Providing Comments/File Documents [See Sources 1-6 above] for the USS Lead Superfund Site in East Chicago, Indiana</p> <p>Email dated: 07/10/2019</p>	<p>Link: F.11 - [IP] East Chicago-OIG Risk Com Team Email Analysis - [Source #7] Email from Deborah Gail Musiker to OIG RC Team Email-East Chicago-07-10-19.pdf</p>
8	<p>Email from (b) (6) on behalf of (b) (6) providing comments/photos [Also see Source 9 below] for the USS Lead Superfund Site in East Chicago, Indiana</p> <p>Email Dated: 07/23/19</p>	<p>Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source #8] Email from (b) (6) behalf of (b) (6) on East Chicago-7-23-19.pdf</p>

9	<p>Photos provided in Email from (b) (6) on behalf of (b) (6) regarding contamination from USS Lead Superfund Site in East Chicago, Indiana</p> <p>Email Dated 07/23/19</p>	<p>a) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9A] (b) (6) Yard 7-14-2019 .jpg</p> <p>b) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9b] (b) (6) Sump Pipe 7-14-2019 .jpg</p> <p>c) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9c] (b) (6) Sump Pit 7-23-2019 .jpg</p> <p>d) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9d] 7-23-2019 Zone 3 Sump Discharge .jpg</p> <p>e) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9e] Zone 2 Basement Seep One 7-14-2019 .jpg</p> <p>f) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9f] Zone 2 Basement Seep Two 7-14-2019 .jpg</p> <p>g) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9g] July 2019 CAMU Zone 1 and 2 .jpg</p> <p>h) Link: F.11 - [C] East Chicago-OIG Risk Com Team Email Analysis - [Source 9h] (b) (6) Dust Test Results 9-31-2017 .jpg</p>
10	<p>East Chicago Calumet Coalition Community Advisory Group (CAG) EPA Grant Info: https://govtribe.com/award/federal-grant-award/project-grant-00e02352 (last visited 5/5/20)</p>	<p>Link: F.11 - [R] PII East Chicago-OIG RC Team Email Analysis - CAG Grant Info.pdf</p>
11	<p>East Chicago Calumet Coalition Community Advisory Group (CAG) Purpose & Mission: https://www.facebook.com/pg/usslead.org/about/?ref=page_internal (last visited 5/5/20)</p>	<p>Link: F.11 - [R] PII East Chicago-OIG RC Team Email Analysis - CAG Mission.pdf</p>

Scope: This workpaper is to document the 6 files received at the OIG Risk Communication Team email (OIG.RiskCommunicationTeam@epa.gov) for the East Chicago site. These file documents were received

by the OIG Team on July 10, 2019 from Deborah Gail (Musiker) Chizewer with Northwestern University School of Law, by the East Chicago Calumet Coalition Community Advisory Group (CAG).

****NOTE: This WP contains PII information and should be handled accordingly****

Conclusion(s):

1. On July 10, 2019, an email was received at the OIG Risk Communication Team Email (OIG.RiskCommunicationTeam@epa.gov) from Deborah Gail (Musiker) Chizewer with Northwestern University School of Law, providing comments/6 files to the OIG Team related to the USS Lead Superfund East Chicago Site [See Source #7 above, Sources 1-6 for the 6 files, and Details Section below describing the 6 files].

Details:

The EPA entered into a grant agreement with the East Chicago Calumet Coalition Community Advisory Group (CAG). The grant agreement allows for the CAG to be a technical advisor to review reports completed by the EPA and prepare documentation which will explain the EPA's findings and resolutions to the members of the group and the affected area (USS Lead community). [Source-10; pdf page-1; Details Section] The stated purpose of the CAG is to work for the citizens, both present residents and prior residents of the USS Lead Superfund Site to educate, help them become aware of the various needs for their own environmental and social justice, and to assist them in their fight to succeed in making sure that the necessary actions of the EPA are being taken. A CAG (Community Advisory Group) assists the EPA in making better decisions on how to clean up a site. It offers EPA a unique opportunity to hear—and seriously consider—community preferences for site cleanup and remediation. The existence of a CAG also does not eliminate the need for the Agency to keep the community informed about plans and decisions throughout the Superfund process. [Source-11; pdf page-1; Purpose]

1. The following documents were provided by Deborah Gail (Musiker) Chizewer with Northwestern University School of Law, by the East Chicago Calumet Coalition Community Advisory Group (CAG) to the OIG team at the OIG Risk Communication Team email (OIG.RiskCommunicationTeam@epa.gov) for the East Chicago Site. Below is a brief description (and in some cases excerpts from the document) for each file document provided:

File 1 –

- A. This document is a letter dated July 10, 2019 from the East Chicago Calumet Coalition Community Advisory Group (CAG) to the OIG providing their comments for the East Chicago Site, as well as recommendations for the OIG Team to consider making to EPA as part of its report on the Agency's risk communication activities [See Source #1 above, PDF pgs. 1-2 of 15].
- B. The letter also provides a timeline of events for the East Chicago Site [See Source #1 above, PDF pgs 3-6 of 15]. The letter further provides comments regarding: site sampling and monitoring results issues [See Source #1 above, PDF pgs. 7-9 of 15], indicators of human health risk and safeguards for protecting human health issues [See Source #1 above, PDF pgs. 9-11 of 15], actions needed to avoid exposure to harmful contaminants or substances [See Source #1 above,

PDF pgs 11-12 of 15], Schedules, milestones, overall timeliness/effectiveness of EPA's communication [See Source #1 above, PDF pgs. 12-15 of 15]

C. Excerpt from File 1 Letter:

Our comments at the meetings and in the attachment provide evidence that:

1. EPA has continually failed to communicate to the public about the contamination;
2. EPA has inappropriately downplayed health risks and not safeguarded the community's health through facilitating proper health screening; and
3. EPA's communications and public meetings lack transparency and accessibility [Source #1 above, PDF pg. 2/15, yellow highlighted]. [Link: INDEX](#)

As part of your report on EPA's communications activities at the USS Lead Site, we request that you make the following recommendations:

1. Require EPA to safeguard the community through regular and ongoing health screening in the community for impacted residents who currently live or lived at the site. There should be no age limit on testing or services because some children moved into the site when they were very young and still suffer impacts as teens or adults.
2. Require that EPA develop a system to ensure that people who might move into the Superfund site know that it is a Superfund site (disclosure).
3. Give residents a seat at the decision-making table to improve decisions and increase transparency.
4. Require EPA to do more door-to-door engagement with residents— particularly to senior citizens or people with less mobility—to explain its activities and decisions at the USS Lead Site [Source #1 above, PDF pg. 2/15, yellow highlighted].

File 2 –

A. This document is a motion to intervene briefing [See Source #2 above, PDF pg. 1/142].

B. It states in the introduction section:

"On September 3, 2014, the United States, on behalf of the United States Environmental Protection Agency, and the State of Indiana (collectively, "the Government") filed this CERCLA action against Defendants Atlantic Richfield Company and DuPont, two of the companies responsible for polluting the USS Lead Superfund Site (the "Site") in East Chicago, Indiana. Along with the Complaint, the Parties simultaneously filed a Consent Decree implementing their pre-negotiated plan to remediate the Site. Now, two years later, this action still presents a pressing public health and environmental crisis that threatens the safety and property of thousands of residents in East Chicago, Indiana. Applicants seek to intervene in this action to protect themselves and their neighbors against these serious threats, and they are afforded the absolute right to do so under CERCLA § 113(i) (42 U.S.C. § 9613(i)) and Federal Rule of Civil Procedure 24(a)(2) ("Rule 24(a)(2)"), which both provide for intervention as a matter of right

when an ongoing action threatens the interests of non-parties. See 42 U.S.C. § 9613(i); Fed. R. Civ. P. 24(a)(2). “[See Source #2 above, PDF pg. 9/142, Introduction, yellow highlighted].

- C. This document also provides pieces of information regarding: (1) Background Info. Related to The USS Lead Superfund Site, EPA's Sporadic Testing and Failure to Act, The Remedial Investigation and Remediation Selection Process; (2) The Consent Decree; (3) Remediation of the USS Lead Site; and (4) the Intervenor's and Arguments [See Source #2 above, PDF pg. 3/142].

File 3 –

- A. This document is reporting by The Agency for Toxic Substances and Disease Registry (ATSDR) for the USS Lead Superfund East Chicago Site [See Source #3 above, PDF pgs. 1&2 of 58].
- B. This document provides pieces of information regarding: (1) Background Info. Related to a Site Description and History, Demographics - Land Use - Natural Resource Use at the Site; (2) Health Outcome Data/Community Health Concerns; (3) Environmental Contamination and Other Hazards at the Site; (4) Toxicological Considerations and Child Health Considerations; and (5) Recommendations [See Source #3 above, PDF pgs. 7/58].

File 4 -

- A. This document is a letter dated April 27, 2018 from the East Chicago Calumet Coalition Community Advisory Group (CAG) to the EPA Region 5 Administrator and the Region 5 Director of the Superfund Division providing the CAG's comments on the Lead and Arsenic Dust Sampling and Cleaning Protocol at the USS Lead Superfund/East Chicago Site [See Source #4 above, PDF pgs. 2/12, yellow highlights].


File 5 –

- A. This document is a letter dated January 14, 2019 from the East Chicago Calumet Coalition Community Advisory Group (CAG), Northwestern Pritzker Law Environmental Advocacy Clinic, and the Abrams Environmental Law Clinic at the University of Chicago Law School to the EPA Community Involvement Coordinator (CIC – Janet Pope) providing comments regarding the EPA's November 2018 Proposed Record of Decision Amendment (“PRODA”) for the USS Lead Superfund Site in East Chicago, Indiana in Zone 1 [See Source #5 above, PDF pg. 2/110, yellow highlights].

File 6 –

- A. This document is a letter dated March 12, 2018 from the East Chicago Calumet Coalition Community Advisory Group (CAG), the Northwestern Pritzker Law Environmental Advocacy Clinic, the Abrams Environmental Law Clinic at the University of Chicago Law School, and the Hoosier Environmental Council (HEC), providing comments regarding the Statement of Basis (SB) for the 440-acre DuPont site located at 5215 Kennedy Avenue, East Chicago, Indiana. These comments reflect the point of view of the CAG member residents and focus on the groundwater contamination [See Source #6 above, PDF pg. 2/19, yellow highlights].

2. On July 23, 2019, comments/photos were provided by (b) (6) on behalf (b) (6) (a resident in East Chicago) to the OIG team at the OIG Risk Communication Team email (OIG.RiskCommunicationTeam@epa.gov) for the East Chicago Site regarding the poor handling of contamination at (b) (6) house/yard [See Source #8 for comments, and Source #9a-h for photos above].



East Chicago Calumet Coalition Community Advisory Group (CAG)
USS Lead Superfund Site
P.O. Box 2321
East Chicago, IN 46312

July 10, 2019

By electronic email: oig.riskcommunicationteam@epa.gov

Office of the Inspector General
United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W. (2410T)
Washington, DC 20460

Re: Office of the Inspector General Investigation: EPA's Communication

Dear Ms. Lovingood and Ms. Trynosky,

Thank you again for including the USS Lead Superfund Site in East Chicago, Indiana in the Office of Inspector General's (OIG) investigation of the way the United States Environmental Protection Agency (EPA) communicates health risks at contaminated sites. We very much appreciated that you made time to meet with the CAG leaders on Tuesday, June 25, 2019 in addition to the public meeting held on Wednesday, June 26, 2019.

At the end of the public meeting, we were thrilled to learn that the OIG would call to EPA Region 5's attention some pressing matters that were raised during the meetings. We also support OIG's decision to expand the time period covered in its report on EPA's communications at the USS Lead Site. EPA's handling of the USS Lead Site has been problematic on many levels, not just communication issues; we request that OIG prepare an additional report that focuses exclusively on the concerns with EPA's management of the USS Lead Site.

With regard to your current investigation, we are submitting the attached document to provide you with a written record and supporting documentation for the points we discussed at the meeting. We also encourage you to contact us with follow up questions or requests for documents.

Our comments at the meetings and in the attachment provide evidence that:

1. EPA has continually failed to communicate to the public about the contamination;
2. EPA has inappropriately downplayed health risks and not safeguarded the community's health through facilitating proper health screening; and
3. EPA's communications and public meetings lack transparency and accessibility.

As part of your report on EPA's communications activities at the USS Lead Site, we request that you make the following recommendations:

1. Require EPA to safeguard the community through regular and ongoing health screening in the community for impacted residents who currently live or lived at the site. There should be no age limit on testing or services because some children moved into the site when they were very young and still suffer impacts as teens or adults.
2. Require that EPA develop a system to ensure that people who might move into the Superfund site know that it is a Superfund site (disclosure).
3. Give residents a seat at the decision-making table to improve decisions and increase transparency.
4. Require EPA to do more door-to-door engagement with residents—particularly to senior citizens or people with less mobility—to explain its activities and decisions at the USS Lead Site.

We also request that at the same time you allow EPA to review the draft report, that you provide a copy of the draft to the public.

Thank you for your careful investigation of the communications issues found at the USS Lead Site. We look forward to seeing your recommendations later this year.

Sincerely,



Maritza Lopez



Akeeshea Daniels



Tara Adams



Lori Locklear

East Chicago Calumet Coalition Community Advisory Group

USS Lead Superfund Site: Recap of Communications Issues

I. Timeline

As we have discussed, EPA knew about the contamination at the USS Lead Site for decades before it listed the lead and arsenic contaminated site on the National Priorities List (NPL) in 2009. It communicated very little to residents until 2009, and has continued to provide inadequate information to this day.

Below, you will find a timeline of select, significant events. We also encourage you to visit the Northwest Indiana Times' timeline of events:

https://www.nwitimes.com/timeline-history-of-the-uss-lead-superfund-site-in-e/article_eb369585-9e14-5a88-98c0-74c0fbaba5ea.html

1893-1985 (and later): Industrial operations are ongoing on and adjacent to the residential area of the USS Lead Superfund Site, including production of chemicals and lead-arsenic pesticides at the DuPont facility, lead smelting, etc.

1972: West Calumet Housing Complex, federally-assisted public housing, is built on land known to be contaminated.

1985: EPA knows about widespread contamination:

- USS Lead closes the last operating smelter due to pressure related to its poor environmental practices.
- United States Congressman Peter Visclosky notifies EPA that the area is extensively contaminated and requests an investigation.
- Investigation shows that nearby residential properties have elevated lead levels. See Inspection Report, Hammond Lead and USS Lead Refining Soil Survey (October 15, 1985), NWI Times timeline.

1992: EPA announces that it has proposed adding the USS Lead site to the NPL. See EPA, "EPA Proposes 2 Midwest Sites for Superfund List," No. 92-SF10 (February 7, 1992), NWI Times Timeline. Then, EPA suddenly changes course when USS Lead and the Indiana Department of Environmental Management (IDEM) indicate that USS Lead is prepared to remediate the site under the Resource Conservation and Recovery Act (RCRA).

Nothing is done to address contamination in the adjacent residential area and nothing is communicated to residents about ongoing risk.

The limited remediation of the USS Lead property has proven ineffective, but EPA has delayed taking further action at the site or communicating with residents about that risk. The USS Lead property has now become Operable Unit 2 of the USS Lead Site.

1997/1998: The Indiana State Department of Public Health and the Agency for Toxic Substances and Disease Registry (ATSDR) prepare a report, for EPA and IDEM, which

recommends that the land be cleaned. The report bases that recommendation, in part, on results of samples taken from children living at the West Calumet Public Housing Complex, with 30% of the tested children have high blood lead levels. See ATSDR 2018 Health Consultation.

As far as we know, no clean up happens and families are told nothing.

1997: DuPont and EPA enter into a RCRA corrective action order to investigate contamination at DuPont facility. The need for remediation is ongoing to this day, as reflected in the 2018 proposed plans for further remediation.

2009: USS Lead Site is listed on the NPL.

2011: ATSDR prepares a patently flawed federal health report, which concluded “breathing the air, drinking tap water or playing in soil around the USS Lead Site is not expected to harm people’s health.” EPA relies on this report and proceeds without urgency.

2012: EPA issues a Record of Decision (ROD) detailing the plans for remediating the USS Lead Superfund Site, residential area—known as Operable Unit 1.

- Risks from lead and arsenic continues to be downplayed at the site. Residents are given generic lead handouts that do not make clear that the lead contamination varies across the USS Lead site and is severe in some areas.

2014: EPA enters into a Consent Decree with the potentially responsible parties (PRPs). For the first time, the Consent Decree divides up Operable Unit 1 into three zones and eliminates Zone 2, one of the zones, from the Consent Decree.

- In the two years between the issuance of the ROD and the lodging of the Consent Decree, residents learn nothing about measures that they should take to protect themselves from the ongoing exposures to lead and arsenic.
- Most residents do not even know about the Consent Decree.
- Residents receive no information about basis for decision to eliminate Zone 2 or timeline for the possible clean-up of the omitted area. The handout announcing the Consent Decree simply states that “Zone 2 will be cleaned up under a separate agreement.”¹

2014/2015/2016: Soil sampling begins in Zones 1 and 3.

¹ See EPA, “Agreement Helps Start Project to Clean Up Contaminated Soil,” (November 2014).

Even though EPA begins obtaining access agreements for sampling as early as November 2014, many residents do not receive results until after September 2016. Residents receive little information about the purpose for the sampling or steps to be taken while awaiting more information about the extent of contamination.

EPA holds back sampling data that shows that residents are exposed to extremely high, lead contamination, while it debates the sampling results with the PRPs.

May 2016: The Mayor of East Chicago learns of the severe levels of lead and arsenic soil contamination at the West Calumet Housing Complex, *but no information is shared with the public.*

July 2016: The Mayor announces that the public housing complex residents will be relocated because the contamination was so severe.

- In Summer 2016, EPA places signs in Zone 1 indicating the danger. It never puts those signs in Zone 2 and 3 even though many properties also have extremely high lead and arsenic levels.
- EPA continues to downplay the health risks at the public meetings during this initial period.
- EPA repeatedly tells residents that they would have been fine if they remained in their homes and EPA had proceeded with the cleanup. This creates increased confusion.

March 2017: EPA never explains why Zone 2 is left out, but, in response to public pressure, EPA and the PRPs enter into an Administrative Order on Consent to fund removal actions in Zone 2 and Zone 3.

December 2017: EPA issues a Unilateral Administrative Order to the PRPs requiring them to undertake the indoor lead dust investigation and remediation.

July 2018: EPA releases final decision for remediation of DuPont facility. The RCRA plan leaves out groundwater that has migrated into residential area. Residents are told that groundwater will not be addressed now but will ultimately be completed as part of the USS Lead Site OU2 investigation.

August 2018: ATSDR releases a corrected report that shows that kids living on the USS Lead Site are much more likely to have elevated blood lead levels than the rest of the kids in East Chicago. Still, nothing changes about communicating about health and no additional screening has occurred at the USS Lead Site. EPA also fails to consider this ATSDR report when it revisits the remediation plan for Zone 1.

November 2018—Present: EPA issues a draft plan for an amended Zone 1 cleanup, but the plan does not adequately address human health risk, and EPA's presentations about the Zone 1 plan have been misleading and lacking in transparency.

In general, the lack of communication or accurate communication has continued since 2016. EPA continues to downplay risks from ongoing soil contamination, indoor lead dust, and groundwater.

II. Comments

A. Site Sampling and monitoring results

EPA's communications regarding soil sampling have been very problematic. First, EPA's extreme delay in distributing soil sampling results in the 2010-2016 time period—and especially from 2015-2016—have caused residents to suffer prolonged exposure to extremely high levels of lead and arsenic contamination. Second, EPA had not taken urgent and interim measures to prevent further exposure to lead and arsenic until Summer 2016 and since then its measures have been lacking. Third, EPA's soil and indoor sampling result reports are confusing generally—and even more so in this community with varying literacy levels.

1. Delayed release of soil sampling results:

- **Nine months of delayed notice in 2015-2016:**
 - EPA began soil sampling in Zone 1 (West Calumet Housing Complex) in May 2015, but the results were not provided to the City of East Chicago until May 2016.²
 - West Calumet Housing Complex residents only received the results in July 2016, after the Mayor of East Chicago announced that residents in the West Calumet Housing Complex would be relocated. *Community Groups' Motion to Intervene*, 2-3, 16-18.
 - EPA has explained that the delay resulted from concerns with the accuracy of the data and ultimately an ongoing debate with the PRPs about the accuracy of the data. See *Community Groups' Reply in Support of Motion to Intervene*, 17 (citing to EPA employee declarations—See *Alcamo Declaration*, ¶ 14; *Balotti Declaration*, ¶ 28(c)(ii)).
- **Failed follow-through:**
 - For Zone 3, some residents signed access agreements as early as 2010 and 2011, but never heard anything back from EPA—and did not know whether sampling of their property occurred.
 - In June 2015, EPA finally sampled some Zone 3 properties but results were not released until September 2016 or later. See *Plaintiff's Objection to Motion to Intervene*, 11.

² The USS Lead Site sampling notification break down also reveals a systemic flaw in that EPA notified the owner of the property, the East Chicago Housing Authority, and not the tenant residents. EPA should not depend on the landlord to notify residents.

- Zone 2 soil sampling did not occur until late 2016—and only occurred due to public pressure.

2. Inadequate Indoor Dust Sampling and Remediation Communication:

- **Failure to evaluate indoor dust exposure pathway:**
 - Despite the fact that EPA’s own Superfund Lead-Contaminated Residential Sites Handbook³ specifies that EPA should consider lead-contaminated indoor dust, EPA’s 2012 final remediation plan, set forth in its Record of Decision (ROD) did not reflect or include evaluation of the indoor dust exposure pathway.
 - EPA failed to provide any justification for why it skipped the indoor dust investigation.
 - In response to community pressure in 2016, EPA has undertaken some indoor dust investigation.
- **No opportunity for public comment on the indoor lead dust plan:**
 - EPA’s Unilateral Administrative Order, issued in December 2017, requires the PRPs to undertake some indoor dust cleanup.
 - Because EPA has relied on an administrative agreement as the tool to fund the Zone 2 remediation, it did not invite public comment. Accordingly, this important part of the remediation lacked the benefit of public input.
- **Limited scope of indoor sampling:**
 - EPA’s indoor sampling is limited to homes where the exterior soil sampling shows that remediation is appropriate. Again, EPA has failed to communicate widely its justification for this approach—which is not supported by science or experience.
 - For instance, a pregnant resident insisted on indoor testing due to nearby excavation activities, even though her property did not exceed the threshold of 400 ppm of lead that triggers remediation; her indoor dust exceeded the threshold level of 316 ppm. CAG Letter to EPA Re Dust Standards (“CAG Dust Letter”), 4.

³ See EPA, Superfund Lead-Contaminated Residential Sites Handbook, 50 (August 2003), <https://semspub.epa.gov/work/HQ/175343.pdf>

- **Inadequate sampling reports:**
 - For the sites where EPA is undertaking indoor dust sampling, its sampling reports that are highly technical, misleading and confusing.
 - Sampling data cannot be compared: EPA’s sampling reports use apples and oranges, which is not consistent with standard sampling practices. EPA provides pre-cleaning lead and arsenic levels in the form of a dust concentration value (parts per million) and post-cleaning value in the form of a dust loading value (micrograms per square foot). These are not comparable and render it impossible for residents to determine whether cleaning was effective. *See CAG Dust Letter, 8-9.*
 - Unreliable lead paint results: EPA’s reports indicate in small writing that residents should not rely on the results for lead-based paint screening, but suggest that residents should instead arrange for an Indiana-certified lead paint expert to come and test for lead paint. Residents may overlook the small writing and may rely only on the information provided to them orally at the time of the testing. Moreover, residents typically lack funding for independent lead-based paint testing.
- **EPA lacks urgency around the lead dust cleaning.** Lead and arsenic dust in residents’ homes often sat for six more months after the original sampling. Indeed, at a public meeting on September 16, 2017, an EPA official described the interior work as a “nicety” designed to close the remediation for each home.

B. Indicators of human health risk and safeguards for protecting human health

EPA has consistently downplayed health risks from the beginning.

1. EPA relied on obviously flawed health reports:

- In 2011, as part of EPA’s evaluation of the contamination and preparation of the proposed remediation plan, the ATSDR prepared a report for the USS Lead Site in which it erroneously concluded “[b]reathing the air, drinking tap water or playing in soil in neighborhoods near the USS Lead Site is not expected to harm

people's health."⁴ See ATSDR 2018 Health Consultation, 16-17 (quoting 2011 report).⁵

- The ATSDR issued a corrective report in 2018, in which it concluded that children living on the USS Lead Site were up to three times as likely to have elevated blood lead levels as the rest of East Chicago. Even after the 2018 Health Consultation was issued, EPA and ATSDR have not exhibited a greater sense of urgency to ensure that residents are getting blood lead level testing.
- To date, EPA has failed to take into account the ATSDR report when preparing a new proposed plan for Zone 1 remediation.

2. Limited screening for health issues:

- The blood lead testing in the community focuses on younger children and fails to assess older children that may have been exposed to high lead levels when they were younger and now have diseases or symptoms associated with that earlier exposure.
- No arsenic-related human health screening has been provided in this community.

3. EPA-sponsored experts downplay risk:

- EPA and ATSDR have invited an environmental health expert to present at EPA meetings, but the expert also has downplayed the risks.
 - For instance, she relied on the fact that lead blood levels have declined over the decades to assure residents that they are okay, even though the Centers for Disease Control has made clear that no lead levels are safe.

⁴ The inclusion of "drinking water" in the 2011 report is particularly shocking since no testing of drinking water happened. Later, from October through December, 2016, EPA conducted a pilot study of drinking water to learn that it was contaminated with lead—due to the inadequate corrosion control of lead service lines. See EPA Drinking Water Study Final Data (January 20, 2017), <https://www.epa.gov/uss-lead-superfund-site/uss-lead-drinking-water-pilot-study-data>

⁵ See also Reuters, "Special Report: Flawed CDC Report Left Indiana Children Vulnerable to Lead Poisoning," (September 28, 2019), <https://www.reuters.com/article/us-usa-pollution-report-specialreport/special-report-flawed-cdc-report-left-indiana-children-vulnerable-to-lead-poisoning-idUSKCN11Y1BH>

- Other comments from the EPA-sponsored “expert” include statements that residents only will get lead poisoned from eating a fishing lure made of lead.⁶

C. Actions needed to avoid exposure to harmful contaminants or substances

EPA can do more to protect residents from ongoing exposures to hazardous contamination as residents before, during and after the remediation. This section addresses the lack of notice in terms of signage, disclosure to potential buyers/renters, clear guidance on lead and arsenic exposure through soil, indoor dust and drinking water.

1. Failure to take interim measures to prevent further lead and arsenic exposure:

- **Lack of signage:**

- Yard signs: EPA did not place any signs in yards warning residents to avoid playing in the soil until July 2016. Even then, EPA only has placed the signs in Zone 1. Zones 2 and 3 have never received similar warnings despite the fact that some properties in those zones also had severe levels of contamination. *Community’s Motion to Intervene, 18.*
- Adjacent DuPont Site: EPA has waited decades to place signage on the fences surrounding the DuPont RCRA site, even though such signage is required under RCRA regulations. Even after residents expressly requested the signs, EPA has waited another 10 months to put in place the required signage on fencing around the DuPont RCRA site. This highly contaminated DuPont site sits adjacent to the residential area of the USS Lead Site.

- **Drinking water communication and actions:**

- EPA identified that the drinking water posed another source of lead exposure in the community, due to the presence of lead service lines and inadequate corrosion control. Still, EPA did not communicate clearly with the residents regarding what measures residents should take to protect themselves. *For instance, at one public meeting, with a dedicated presentation on drinking water issues, EPA could not answer the question of whether it was safe to drink the water.*

⁶ Note that although the CAG could not track down a transcript for the meetings when those statements were made, we have a record that the expert participated in EPA meetings on September 16, 2016 and January 2017.

- Ultimately, in response to resident and advocate pressure, IDEM provided filters for residents living on the USS Lead site, and the City of East Chicago has begun replacing lead service lines. *However, no agency has provided replacement filters while residents await lead service line replacement.*

2. EPA handouts are inadequate:

- **Handouts have not been fully accessible or complete:⁷**
 - Until 2016, EPA's handouts were almost exclusively in English even though a high percentage of Spanish-speaking residents live on the USS Lead Site.
 - Literacy levels vary at the USS Lead Site but no handouts were geared toward lower literacy levels.
- **Insufficient door-to-door community engagement has occurred.** More door-to-door engagement could reinforce communications about measures that can be taken to prevent and reduce exposure.

3. Buyers and renters at the USS Lead Site typically lack notice of the status of the contaminated property.

- As recently as May 2019, residents have moved into the Superfund site without knowing about the contamination.
- A church moved into the Carrie Gosch School in Zone 1, but then moved out less than twelve months later, possibly because the area needs to be remediated. According to church leaders, EPA had previously informed the church that it was safe for the church to occupy the building.

D. Schedules, milestones, overall timeliness/effectiveness of EPA's communication

EPA's performance has varied across these schedules, milestones and timeliness and effectiveness of communications. As noted above, decades went by where EPA completely ignored the imminent and substantial endangerment facing the residents living at the USS Lead Site. Beginning in 2016, and in response to public pressure, EPA's soil remediation progress at the Site has improved dramatically. The Operable Unit 2 Groundwater Study remains very slow moving, though.

EPA's communication at public meetings is ineffective as a general rule. This section provides comments relating to the public meeting process for the

⁷ Handouts from 2009 only reference the lead contamination and ignored the arsenic contamination.

pending Zone 1 proposed plan, DuPont-related meetings, and general communication problems at public meetings.

1. Zone 1 Proposed Remediation Plan.

- **Public Participation:**
 - Several residents did not have the opportunity to provide oral comment at USEPA's November 29, 2018 public meeting. In response to the CAG's letter requesting a second public comment meeting, USEPA agreed to schedule a January 10 meeting. USEPA then cancelled the meeting due to the government shutdown, and initially did not extend comment deadline or promise to reschedule the second public meeting. Only in response to media attention and public pressure did EPA reschedule the second meeting and re-opened the comment period. CAG 3.13.19 Comments on Zone 1 plan, 23.
 - The proposed remediation plan contains a *contingency* that enables EPA to change the plan after the public comment period is closed and without re-opening the public comment period. CAG 1.14.19 Comments on Zone 1 Plan, 3.
- **Misleading and confusing statements by USEPA:** The Zone 1 proposed plan meetings have involved statements in direct conflict with the written proposals and past statements.
 - EPA failed to detail and account for institutional controls (ICs) in a way that favors its preferred cleanup option, Alternative B: USEPA has failed to provide sufficiently detailed descriptions of the ICs, including what steps the landowners or utilities will need to take in order to dig deeper than 24" and the full costs associated with implementing these ICs. This omission is contrary to EPA's own guidance and impedes informed public comments. CAG 3.13.19 Comments on Zone 1 Plan, 3. EPA also has underestimated the costs of the ICs for Alternative 4B in a way that skews the cost comparison between 4B and the other alternatives. *Id.*
 - Example of misleading statement: At the February 13 meeting, an EPA official stated, "We looked at the current groundwater data that we have in Zone 1 specifically and the concentrations are fairly low."⁸

⁸ February 13, 2019 Public Meeting Transcript (Boss Reporters), 38, line 2-5, available at <https://semspub.epa.gov/work/05/946308.pdf>. The EPA made this statement, even though there was a public available report, produced by Amereco as part of the City of East Chicago's preparation of the environmental assessment for the demolition of the West Calumet Housing Complex; the Amereco Report

But, when challenged about that statement, EPA acknowledged, “[Y]ou are absolutely correct. Arsenic is high in the groundwater, . . .”⁹

- **Redevelopment—Public Engagement:** EPA has failed to engage the public in discussions about planned redevelopment of Zone 1, even though the Superfund Task Force Report sets out that recommendation. CAG 3.13.19 Comments, 28.

2. DuPont site remediation communications and meetings:

- **Procedural concerns:**
 - Delay and lack of communication: Even though a corrective action order has been in place for 22 years, the DuPont site remains severely contaminated. There has been very little communication about the off-site contamination from the DuPont site. Meanwhile, it is undisputed that an arsenic plume has been moving from the DuPont site under the residential area of the USS Lead Site.
 - Risk assessment and communication: EPA has relied on outdated risk assessment data and has failed to explain adequately the logic behind its use of this data and other limited evidence. CAG Comments DuPont Statement of Basis (3.12.18), 6-9.
 - Communications at meetings: EPA’s teams are divided into a RCRA silo and a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) silo, but the resulting contamination—from the adjacent RCRA and CERCLA sites—impacts the same group of residents. EPA seems to be deferring questions to its other teams (CERCLA or RCRA), rather than having both sets of teams present at the meetings to answer questions.
- **Substantive concerns:**
 - Contaminated groundwater: A known arsenic plume has migrated from the DuPont site to the residential area of the USS Lead Superfund site. EPA downplays the risks to residents from arsenic-contaminated groundwater by noting that residents do not drink the water. The levels of arsenic in the groundwater exceed EPA’s applicable standard for triggering remediation. CAG Comments DuPont Statement of Basis, 6-7.

indicates that lead and arsenic levels in groundwater exceed the applicable standard. See Amereco report at <https://semspub.epa.gov/work/05/941443.pdf>.

⁹ *Id.* at 40-41, lines 24, 25, 1

- Contaminated air: Little attention has been paid to the potential for contaminated, fugitive dust emissions to impact the surrounding neighborhood; no air monitors are in place at the DuPont site.

3. Regular EPA meetings:

- EPA has held several public meetings at the USS Lead Superfund Site since 2016, and it has shared schedule information and milestones. While this information is useful to the community, it can be misleading because its progress reports may imply that the site is almost completely remediated, when the remediation that has been completed is only the soil remediation and, in some cases, indoor dust remediation. Groundwater contamination remains at the site and flows under residential properties.
- The information shared is often pitched at a technical level that is much too complicated for the average resident and is a possible contributing factor to low public attendance at meetings.
- The EPA-contracted independent facilitator has demonstrated bias toward EPA and has acted unprofessionally at meetings. Despite this issue being raised with EPA, no change has been made.

III. Conclusion

OIG's investigation addresses a critical and pressing need for improved communications by EPA at contaminated sites. EPA may point to improvements it has made in its communications at the USS Lead Site. For instance, EPA more regularly posts its materials on its dedicated website for the EPA USS Lead Site. It also recently began distributing a newsletter to summarize the status of activities at the site.

While we acknowledge these improvements, those communications should have happened from the moment EPA began considering the USS Lead Site for the NPL. Moreover, they are not sufficient to help residents understand and manage the risks associated with living on a contaminated site. EPA also can do more to provide safeguards for residents living at the site, including provide regular lead and arsenic health screening. Finally, EPA should engage the impacted community more effectively so that decisions at the USS Lead Site reflect the experience and needs of the residents living on the contaminated site.

OIG should use this opportunity to put in place recommendations that will have meaningful impact for the residents living on the USS Lead Site. We also request that OIG conduct a separate investigation that focuses exclusively on the mismanagement of the USS Lead Site and goes beyond the problems associated with communications.

Chugh, Alisha

From: Deborah Gail Musiker <Debbie.M.Chizewer@law.northwestern.edu>
Sent: Wednesday, July 10, 2019 3:15 PM
To: OIG.RiskCommunicationTeam; Trynosky, Jill; Krenzien, Allison; Lovingood, Christina
Cc: Nancy Loeb; templeton@uchicago.edu
Subject: Office of Inspector General Investigation of EPA's Communication: Written Comments and Supporting Documentation
Attachments: 7.10.19FinalLetterCAGtoOIG_USS Lead Site.pdf; 2019.07.10 Motion to Intervene Briefing.pdf; 2019.07.10 ATSDR Reports.pdf; 2019.07.10 CAG Letter to EPA re Interior Dust.pdf; 2019.07.10 CAG's Zone 1 Comments.pdf; 2019.07.10 CAG's Comments-DuPont Statement of Basis.pdf
Categories: Urgent/Important, Land Job

Dear Ms. Lovingood and Ms. Trynosky,

Please find attached comments of the *East Chicago Calumet Coalition Community Advisory Group (CAG)*, as well as supporting documentation (referenced in the attached comments), in follow up to the CAG's meeting with the Office of Inspector General regarding the USS Lead Site in East Chicago, Indiana.

Do not hesitate to contact us if you have any questions. Please make sure to copy Nancy Loeb and Mark Templeton on any correspondence.

Thanks,

Debbie Chizewer

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Collier, Morgan

From: Lovingood, Christina
Sent: Monday, August 10, 2020 7:41 AM
To: Milligan, Patrick; Maxwell, Ryan; Mulchandani, Roopa; Beeson, Benjamin W.
Cc: Trynosky, Jill; Park, Bo; Collier, Morgan
Subject: FW: Docket ID No. EPA-HQ-SFUND-2008-0577 - Proposed Removal of 671 Properties at the USS Lead Superfund Site from the National Priorities List (NPL) by U.S. Environmental Protection Agency (U.S.EPA)..

Categories: Record Saved - Private

Dear RC Team, In reading my email this morning, I found some important updates to the E Chicago site.

- 1) As you are all aware, EPA has proposed removing 671 properties from the NPL. (b) (6) one of the people whom we heard speak at our listening session, provided the information below in response to the proposal. You may also be aware that, in response to a hotline complaint on the issue of the groundwater potentially contaminating the basements, we sent a letter to Region 5 requesting information. The response, I had believed, resolved the matter, but it appears it did not. I will be forwarding this letter to the hotline with a suggested referral to CID. If, as you read the letter, you have any other suggestions, I welcome them. At a minimum, we need to keep this letter for our records in the wps.
- 2) In another email which I will next send you, is an article indicating that the City plans to sell the former West Calumet Housing property to a "warehousing and logistical" company. Again, something to keep in the wps for our records.

Tina

Tina Lovingood
Director, Land Cleanup and Waste Management Audits and Evaluations
Office of Audit and Evaluation
Office of Inspector General
202-566-2906

From: (b) (6)
Sent: Friday, August 7, 2020 6:14 PM
To: (b) (6)

(b) (6)

Cc: (b) (6)
(b) (6)

Subject: RE: Docket ID No. EPA-HQ-SFUND-2008-0577 - Proposed Removal of 671 Properties at the USS Lead Superfund Site from the National Priorities List (NPL) by U.S. Environmental Protection Agency (U.S.EPA)..

August 7, 2020

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RE: Docket ID No. EPA-HQ-SFUND-2008-0577 – Proposed Removal of 671 Properties at the USS Lead Superfund Site from the National Priorities List (NPL) by U.S. Environmental Protection Agency (U.S.EPA).

Hello, the U.S. EPA and Indiana Department of Environmental Management (IDEM) have disregarded East Chicago, Indiana residents' repeated statements concerning chronic flooding events and subsurface intrusion of toxic substances in homes located upon the USS Lead Superfund Site for years...

U.S. EPA has ignored evidence that demonstrates the ongoing transport of toxic sediment through the flow of groundwater and has made no effort to investigate these recognized routes of toxic contaminant exposure since sampling and analysis results were provided to U.S. EPA on September 27, 2019.

This is true even though U.S. EPA and IDEM know that the remaining in homes located upon the USS Lead Superfund Site are serviced by combined sewers that:

- 1) periodically flood people's homes and property;

- 2) overflow into and/or back up from the highly contaminated Grand Calumet River;
- 3) have been known to be contaminated with Arsenic and Zinc since the late 1970s and early 1980s;
- 4) receive contaminated groundwater pumped from within the USS Lead Superfund Site's Corrective Action Management Unit (CAMU) designated as part of OU2 which contains high concentrations of untreated listed Hazardous wastes banned from land disposal and is unlined without any leachate collection system or pretreatment system;
- 5) are in various states of disrepair or stages of failure and have received industrial discharges from sites of known contamination for decades along with ongoing contaminated groundwater and sediment infiltration throughout the system...

The USS Lead Superfund Site has exhibited elevated water chemistries and demonstrated Subsurface Intrusion of Toxic Particles as compared to average background levels for Metals in Northwest Indiana's Calumet Aquifer and Quartz Tolleston Dune Sand Soils!

In 2009 U.S. EPA's On-Scene Coordinator at the USS Lead Superfund Site wrote:

"... As a part of their activities, companies in the Site area generated Lead products or wastes in a Particulate form."

"The potential Emission Sources at these facilities include furnace stacks, waste piles, and spills of Lead products..."

"Also, it is believed that Soil impacted with Lead and waste products from Smelting operations may have been given to local residents for use as backfill material."

— 'Federal On-Scene Coordinator's Report, Rev. 1' Weston Solutions, Inc. for U.S. EPA Region V, Emergency Response Branch, August 2009

These sand soils have little or no capacity to adsorb or attenuate toxic pollutants and act as a sieve allowing fine-grained sediments to readily pass through them via the flow of groundwater which is hydraulically connected to Lake Michigan and the Grand Calumet River that also discharges into Lake Michigan.

U.S. EPA and IDEM continue to disregard known pathways of toxic contaminant exposure that were recognized by U.S. EPA early on but never thoroughly investigated since the initial Hazard Ranking Score (HRS) process was completed.

U.S. EPA and IDEM have not sampled at soil depths known to have existed naturally in the Dune and Swale topography or exposed because of historic construction activities or waste/debris disposal within the USS Lead Superfund Site.

U.S. EPA and IDEM continue to ignore information documenting buried wastes and debris within the USS Lead Superfund Site when they could be using ground penetrating radar or other methods of identifying buried sources of contamination and undertaking remedial actions to address the known ongoing subsurface release of contaminants onsite as proven in recent sampling and analysis reports done in OU1.

“Buried Debris” is a euphemism for the toxic contaminated remains of plant sites including contaminated process equipment, buildings, and wastes deliberately disposed of in the Calumet Community underground...

The Administrative Record for the USS Lead Superfund Site references contaminated soils and industrial wastes such as Slag from the Lead Blast Furnace being sold for construction backfill.

I personally witnessed and have photo documented slag deposits that were left in place in Riley Park within the USS Lead Superfund Site during remediation activities. In fact when one of the federal on-scene coordinators was asked why that was being left in place and not cleaned up their response was: “Yea, what is that we are finding that in everyone’s yard...”

Large volumes of contaminated soil remain in many properties slated for NPL delisting because of incomplete removals, not because of the level of contamination found, but because of restrictions on removals versus potential damage to foundations and building structures. Also, removals were not done under trees and some shrubs or any hardscaping such as sidewalks, driveways, patios, etc.

U.S. EPA’s statement that: “These properties have no contamination at-depth and are cleared for residential use” is arbitrary and capricious given:

- 1) the realities on the ground in the Calumet Community that is living on top of the USS Lead Superfund Site;
- 2) the evidence provided in the Administrative Record; and
- 3) information provided by the public since 2016.

Since 2009, there has been an Epic Failure to take action and protect people’s health from serious contamination of Groundwater in the Calumet Aquifer and Subsurface Intrusion of Toxic Particles into homes in the Calumet Community by both the U.S. Government and State of Indiana...!

The Exposure Pathways for:

- 1) Toxic Particles in Groundwater;
- 2) Respirable Dust in contaminated Groundwater Sediments; and
- 3) Fate of Toxic Particles moving through the Groundwater has not been recognized, thoroughly investigated, or evaluated by U.S. EPA and IDEM in over 30 years!

Why does U.S. EPA refuse to take samples of these toxic contaminated sediments infiltrating people’s homes?

Why isn’t U.S. EPA sampling these toxic contaminated sediments in their ongoing groundwater monitoring program?

Why hasn’t U.S. EPA responded to recent flooding events, at least three or more within the last two years, in the USS Lead Superfund Site?

Why hasn't U.S. EPA sampled flood impacted homes and properties to evaluate the extent of any contamination spread by the flood including all U.S. EPA Priority Pollutants and all contaminants known to be present including: PAHs, PCBs, Dioxin, Metals, Pesticides, etc.?

To delist these properties from the NPL now without full and complete investigation of these routes of exposure and to leave large quantities of contaminated soil, toxic wastes, and contaminated debris in place within the USS Lead Superfund Site is not only negligent concerning public health threats but serves only to continue the crime against humanity that has taken place in East Chicago, Indiana where people of color were knowingly put upon contaminated land without their knowledge for decades.

Relying on five-year reviews to revisit this cleanup is unacceptable given all the evidence provided to U.S. EPA by the public since 2016.

The inadequacy for the protection of public health using the cleanup levels selected for the USS Lead Superfund Site is proven by the following...

At one of the Superfund Sites listed and used as a basis of comparison by U.S. EPA USS Lead Superfund Site Zone 1 Remedial Project Manager Thomas Alcamo – Omaha Lead Superfund Site – the site's Second Five Year Review by U.S. EPA states that: "The cleanup level selected for residential yards may not protect children to current CDC-acceptable reference value blood-lead concentrations. The EPA will reexamine blood-lead levels and determine whether additional action is warranted."

"The EPA is aware of information that could call into question the protectiveness of the remedy. Based on findings in the data review and site inspection sections, site conditions are changing at properties. A change in site conditions could affect the protectiveness of the remedy."

"Since the last FYR, the city has inspected 259 properties where the remedy was implemented. For these 259 properties inspected, it was determined that, for 23%, the remedy has not been disturbed; and for 77%, the remedy has been disturbed to some extent. The disturbances range anywhere from having mostly weeds present instead of grass, to having large bare areas, to the structure being demolished since remediation and the remedy not likely remaining intact due to the demolition."

See: [<https://htv-prod-media.s3.amazonaws.com/files/epa-report-1573530651.pdf>]

See Video and Story here: [<https://www.ketv.com/article/the-epa-cleaned-up-lead-in-her-neighborhood-years-ago-she-got-poisoned-this-summer/29763386>]

Given the historic blood levels in children as documented by the most recent Centers for Disease Control (CDC) study [https://www.atsdr.cdc.gov/HAC/pha/USSmelterandLeadRefinery/Blood_Level_Factsheet_English-508.pdf] within the USS Lead Superfund Site and no proof that remedial actions taken so far are adequate to reduce these historically high blood Lead levels in children within the Calumet Community how can U.S. EPA justify its desire to delist these properties from the NLP at this time?

"Children under 6 years old living in the East Calumet neighborhood had the same chance of having a BLL greater than the 5 µg/dL, but a higher chance of a BLL greater than 10 µg/dL, compared to a child living in other locations in East Chicago." – CDC

Certainly it is premature to propose delisting properties now without any proof of the cleanup's efficacy in reducing children's blood Lead levels and to completely ignore the continuing chronic

exposures resulting from unaddressed routes of toxic contaminant pollution impacting these properties and their residents...

The Residential area of the USS Lead Superfund Site was a single Zone until the 2012 Consent Decree divided that single Zone into three zones and completely left Zone 2 out of the cleanup under the agreement between the "Responsible Parties" and U.S. EPA. This division of OU1 follows historic divisions within the Calumet Community based on Class and Race.

This occurred even though high levels of toxic contamination were well known to U.S. EPA and a small number of emergency removals (Lead concentrations above 1,200 ppm) had already taken place previously at properties in the Superfund Site which later became Zone 2 under the Consent Decree.

A Zone 2 resident requesting the U.S. EPA Region V's help and repeatedly requesting testing of (b) (6) basement has experienced literally over a year long delay in U.S. EPA Region V investigating a gross Subsurface Intrusion of contaminated groundwater laden with toxic sediment containing Arsenic as high as 203 ppm within (b) (6) home located on the USS Lead Superfund Site. As far as I am aware no sampling has yet to be done.

This is a basement that U.S. EPA Region V Remedial Project managers have stated they visited on at least two occasions as documented in video tape of a U.S. EPA Region V USS Lead Superfund Site meeting November 17, 2018 when (b) (6) said that (b) (6) was asking for the third time for EPA to test (b) (6) basement or put in writing why they were refusing to test it.

There was no cleanup planned for Zone 2 until national attention was focused first on Flint, Michigan and then East Chicago, Indiana concerning toxic Lead contamination. That attention and embarrassment over the fact that there was no cleanup plan for Zone 2 lead to Emergency Administrative Orders by U.S. EPA to the "Responsible Parties" to finally conduct removal activities in Zone 2 in starting in 2019.

East Chicago, Indiana, has a polluted environment that with an established cancer risk of 310 in 1,000,000 when 1 in 1,000,000 is considered an acceptable risk by U.S. EPA.

East Chicago, Indiana, is a recognized Environmental Justice (EJ) community. U.S. EPA "...Region 5 considers this site a high-priority potential EJ area of concern."

The USS Lead Superfund Site was: "...the highest ranking in Region 5 under the National Corrective Action Prioritization System and it was proposed for the National Priority List (NPL) in 1987." "EPA listed the USS Lead site to the National Priorities List (NPL) in 2009."

How does all that square with the demographic facts that Zone 2 created under the Consent Decree by U.S. EPA and the "Responsible Parties" is the poorest and highest percent minority population within the USS Lead Superfund Site?

This is not Environmental Justice this is clear bias by the "Responsible Parties" and U.S. EPA Region V and looks a lot more like Environmental Racism in my opinion.

U.S. EPA must thoroughly investigate the flooding events and sub-surface intrusion impacts to public health before delisting these properties from the NPL.

U.S. EPA needs to take adequate remedial actions at those properties found to be contaminated by flooding events and ongoing sub-surface intrusion of contaminated groundwater and the toxic sediments transported by it before any delisting of properties takes place. To do so otherwise is not protective of public health...

Why is U.S. EPA Region V not seriously investigating what concerns the residents are communicate to them including but not limited to: Buried Wastes, Basement Flooding, Recontamination, and Subsurface Intrusion of toxic contaminated groundwater?

Why are actions not being taken by U.S. EPA to protect public health concerning:

- 1) known off-site sales of Slag and smelter wastes from the Lead smelting Blast Furnace at the USS Lead Refiner;
- 2) known use of contaminated soil and smelter waste for construction backfill in the area of the Superfund Site;
- 3) known incidents of buried Subsurface Wastes and Plant Debris underground within the Superfund Site and/or Calumet Aquifer;
- 4) known frequent and/or seasonal Basement Flooding within the Superfund Site;
- 5) known Subsurface Intrusion of contaminated groundwater and toxic sediment into residents' homes, especially those located on Alexander and Melville Avenues, in the USS Lead Superfund Site?

Some Established Facts:

The State of Indiana and U.S. EPA have known about the toxic contamination in the Calumet community of East Chicago, Indiana since 1985.

There is evidence that DuPont was investigating their 105-year-old, 444-acre site, (the largest chemical and pesticide plant in the world) as early as 1968 and that gross groundwater contamination with Arsenic and Zinc was known as early as 1979...

The City of East Chicago, Indiana investigated high groundwater and Arsenic contamination in the groundwater in 2007 on Ivy Street in what would become Zone 3 of the USS Lead Superfund Site and the results indicated homes with contaminated groundwater in a basement sump above the U.S. EPA's MCL for Arsenic at 39 ppb, 48 ppb and 120 ppb Arsenic dissolved into the groundwater at three homes. (Note: no sediment samples were taken).

The investigation recommendations included: "Coordinate with US EPA on the best way to inform residents on Ivy Street of the arsenic identified in the groundwater. The information provided should incorporate possible health effects from exposure to arsenic (particularly through dermal contact and inhalation) and way to minimize exposure."

Contaminated groundwater is being discharged by sump pumps in residents' basements to the surface where recontamination can and does occur. The Superfund Site area is serviced by a combined sewer system...

Basement flooding by contaminated groundwater and/or the combined sewer system frequently occurs within the Superfund Site and the area is currently experiencing a record high groundwater level (1 to 4 feet below the surface on the south side of the Superfund Site) which is also compounded by the near record levels of nearby Lake Michigan which is hydraulically connected to the Calumet Aquifer beneath the Superfund Site.

U.S. EPA has confirmed toxic contaminated Dust in several homes within the Superfund Site but refuses to test adjacent homes that were not part of the current contaminated soil removal actions.

U.S. EPA has confirmed a Drinking Water Quality issue for Lead in drinking Water in several homes within the Superfund Site due to Lead Service Lines and home plumbing containing Lead.

Communities adjacent to the USS Lead Superfund Site that are shown as impacted by the Superfund Site in documents contained within the site's Administrative Record have never been contacted by U.S. EPA – let alone any communication of any risks potential contamination could present to their health.

Where sampling has been done south of the Superfund Site high levels (above 400 ppm Lead) of contamination have been found over the years by the State of Indiana and U.S. EPA but nothing has been done to properly investigate or inform the residents of the communities of Gibson Woods and Hessville in Hammond, Indiana one mile away.

The community has not been involved in the current groundwater investigation by U.S. EPA for the Superfund Site and the monitoring wells are all located either on the City of East Chicago, Indiana or "Responsible Party" properties and sampling and testing does not include any sediment sampling within the Calumet Aquifer.

In fact, the U.S. EPA methodology being used for sampling and testing filters out sediment to determine only what is dissolved within the ground water not what is being transported by it (e.g. Toxic Sediments).

U.S. EPA has methodologies for sampling and testing sediment within a groundwater aquifer they are not being deployed in East Chicago, Indiana in the Calumet Aquifer that flows beneath the Superfund Site. To get a complete picture of the contamination and risks involved including its transport and fate these sediments must be properly sampled and analyzed also.

Conclusion:

Perhaps the best way to determine what residents are being exposed to from the groundwater is to sample what's already in their homes –the dust; the groundwater and the sediment it carries through imperfections in foundations and draining into basement sumps; and the potentially toxic residues left when basement flood waters recede or the sediment becomes dry in the winter heating season when humidity drops and forced-air furnaces or heating boilers located in residents basement are in constant operation...?

Perhaps ignoring toxic contaminated sediment within groundwater and having a groundwater monitoring system located on properties whose owners whose priorities are fixated on the potential of quick redevelopment instead of having a first priority to ensure a proper and permanent cleanup (as required under the law) might not be protective of people's health living within the USS Lead Superfund Site?

In Total U.S. EPA's current actions and historical record in East Chicago, Indiana is ripe for investigation and oversight with respect to proper conduct and violations of the laws, regulation, and rules of the United States of America and State of Indiana and unfortunately this is just one example of what has taken place in Northwest Indiana and especially in East Chicago, Indiana where what many people consider a toxic crime against humanity has occurred right here in our nation.

Newspaper Article: [<https://www.chicagotribune.com/suburbs/post-tribune/ct-ptb-ec-crymes-st-1115-20191114-euhsjm3nsbcwxnupqwt7jomiay-story.html>] 'East Chicago man says EPA has been slow to test the rust-colored sludge in his basement for toxins' by Meredith Colias-Pete, Post-Tribune / Chicago Tribune, November 14, 2019

This story was published on November 14, 2019 and the very next day this story was broadcast about the same block of Alexander Street in East Chicago, Indiana: 'Workforce Houses In East Chicago To Be Built On EPA Superfund Site'...! See: [<https://www.wfyi.org/news/articles/workforce-houses-in-east-chicago-to-be-built-on-epa-superfund-site>]

'East Chicago (b) (6) says EPA has been slow to test the rust-colored sludge in his basement for toxins' by Meredith Colias-Pete, Post-Tribune, November 14, 2019

Photograph: 'East Chicago resident (b) (6) asks a question during a public meeting about the U.S.S. Superfund site on Nov. 17, 2018, at the former Carrie Gosch elementary school. (Kyle Telechan/Post-Tribune)'

(b) (6) told the EPA at a November 2018 (b) (6) meeting (b) (6) wanted the water that seeps into (b) (6) basement tested, knowing that the soil outside (b) (6) home is contaminated.

Katherine Thomas, an EPA remedial project manager, said then most of the basement testing was in Zone 3, where about half tested showed high levels of lead. Thomas added that she'd get (b) (6) information to see if they extend the sampling and can test his basement.

Months later, when (b) (6) again told the EPA about (b) (6) basement, in Zone 2, the EPA asked for the lab's results and methodology.

"EPA shares your concerns," Remedial Response Branch Chief Timothy Fischer wrote to (b) (6) on Sept. 27. Fischer told him to have (b) (6) call them so they could "further assess the conditions in the basement."

From (b) (6)
Sent: Friday, September 27, 2019 5:28 PM
To: Fischer, Timothy <Fischer.Timothy@epa.gov>
Cc: Dodds, Jennifer <dodds.jennifer@epa.gov>; Rolfes, Sarah <Rolfes.Sarah@epa.gov>
Subject: RE: USS Lead Response September 27, 2019
Importance: High

Timothy J. Fischer, Chief
Remedial Response Branch #2
Superfund & Emergency Management Division
United States Environmental Protection Agency, Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Telephone: (312) 886-5787
Email: < Fischer.Timothy@epa.gov >

Re: Subsurface Intrusion Hazard in Private Homes within the U.S. Smelter and Lead Refinery, Inc. Superfund Site in East Chicago, Indiana

Hello Mr. Fischer,

I am attaching the laboratory reports for the Grab samples taken on August 9, 2019. The Metals by ICP results are Coded: UE for the Groundwater samples and Coded: SE for the Sediment samples respectively... The Particle Analysis was conducted by a separate laboratory specializing in Particle Size & Shape characterization and a Dust Monitor test was also included for the 4915 sample location.

I am offering to present a PowerPoint presentation documenting Subsurface Intrusion Hazards in Private Homes within the U.S. Smelter and Lead Refinery, Inc. Superfund Site in East Chicago, Indiana in person to interested U.S. EPA Region V staff at the earliest possible time to provide findings of sampling, illustrate scientific points in context, and give proper narration of the data results and background studies used for comparison.

At that time I will also answer any questions as to sample methodology (which is documented in the presentation), Quality Control & Quality Assurance with Chain of Custody procedures, provide copies of Laboratory Results & documentation, and also provide a copy of the PowerPoint presentation on a memory stick with the supporting Reference Documents used in the presentation.

I have received permission to disclose the sample locations from the homeowners and to share the results with U.S. EPA and would like to do so at the soonest available time.

I am concerned about the potential Respirable Dust hazards in homes from dried Toxic sediment residue and the upcoming heating season in homes with forced air heating systems distributing the dust throughout the homes...

You should know that one homeowner in Zone 2 of the USS Lead Superfund Site requested U.S. EPA sample their basement on at least three occasions and that no sampling was ever done by U.S. EPA. It has been documented that U.S. EPA visited this individual's basement at least twice and failed to recognize the ongoing obvious and gross Subsurface Intrusion Hazard (see attached photograph: 'Sediment Sample 4915 8-9-2109') and also failed to take any type of sample whatsoever.

You should also know that of the sampling conducted on August 9, 2019, sediment found in the above referenced homeowner's basement showed the highest levels of contamination found in the samples taken.

This basement is currently partially covered with Toxic sediment transported by the infiltration of large amounts of contaminated Groundwater through defects in the foundation and basement floor of the home and this phenomenon has been ongoing all spring and summer due to record high Groundwater levels in the Calumet Community of East Chicago, Indiana...

Toxic Metal levels as high as 49.5 ppm of Antimony (Sb), 203.1 ppm of Arsenic (As) and 21,394 ppm Manganese (Mg) among others were found in the sediment grab sample at this location.

A particle analysis was done on a duplicate sediment sample for particle size & shape as well as a dust monitor test that showed a significant fraction of the sample particle size to be 10 micron (um) in size or smaller as potential Respirable Dust and that of the dust produced from the sample 42 cumulative % of the dust was characterized as below 10 microns in size by the laboratory...

Please contact me as soon as possible to provide a date and location for presentation of the information you requested.

Sincerely;

(b) (6) (b) (6) Hebron, Indiana 46341 (b) (6) (b) (6)

PII-USS Lead Superfund site Emails Received

<u>NAME</u>	<u>DATE</u>	<u>Comments</u>
Prepared/Completed by: Morgan Collier	9/14/2020	
Reviewed by:	PJM 12/10/20	[]: I reviewed this WP and found it satisfactory. (No comments were provided.) []: I reviewed this WP and found it satisfactory. I also included comments in a dark red colored font . []: All comments have been resolved.
Edited by:		

Purpose: To document emails the OIG has received, as it relates to the USS Lead Superfund Site. **[Auditor's note, this work paper and source documents may contain Personal Identifiable Information (PII)].**

Project Guide Step # : 41

Source(s):

<u>#</u>	<u>Description/Title</u>	<u>Source Document</u>
1	Source 1-Email Related to Concerns on EPA Delisting Part of the USS Lead site and other concerns	<u>Link: PII-Source 1-Proposal to Delist Email.pdf</u>

Scope: The details section gives an overview of the emails the OIG has received in relation to the USS Lead Superfund Site.

Conclusion(s):

- 1.) Several concerns were listed related to public health, to include basement flooding and potential contaminants in the groundwater (See Details [C and D](#)).
- 2.) The private citizen wrote concerns about slag and contaminated soil being left in place (See Details [G and H](#)).
- 3.) The private citizen brought up concerns about children's blood lead levels if the properties were delisted (See Details [L](#)).

- 4.) **Auditor's Note:** Based on the email, this was submitted to US EPA Region 5 during the public comment period for the partial delisting of the site, so these comments, and any other submissions, will be reviewed and considered by US EPA when they decide next steps for the site.

Details:

Source 1: Email Related to Concerns on EPA Delisting Part of the USS Lead site and other concerns

- A.) Tina Lovingood (Director of Land Waste and Cleanup Program Evaluations), wrote the OIG Team highlighting the letter from the private citizen. The citizen expressed concerns related to the EPA's proposal to remove 671 properties from the NPL ([See Source 1, Page 1, List #1](#)).
- B.) According to the letter, it was sent to the following Region 5 staff: NPL Deletion Coordinator and both Community Involvement Coordinators on August 7, 2020 ([See Source 1, Page 2, Top of Page](#)).
- C.) The private citizen states that US EPA and IDEM have both disregarded residents' statements regarding the basements flooding issues in homes for years at the site and haven't made efforts to investigate the issue since September 27, 2019 when analysis results were provided to them ([See Source 1, Page 2, Paragraphs 1-2](#)).
- D.) The private citizen lists several concerns related to the combined sewers, to include: flooding into people's homes, overflow into the Grand Calumet River, contaminants Arsenic and Zinc, hazardous wastes from contaminated groundwater, disrepair of the system ([See Source 1, Pages 2-3, Summary of List 1-5](#)).
- E.) Additional concerns related to soil absorption, hydraulics, pathways of toxic contaminants were listed by the private citizen ([See Source 1, Page 3, Summary of Paragraphs 7-8](#)).
- F.) The private citizen brought up concerns about EPA not sampling depths where historic construction occurred and where buried sources of contamination are ([See Source 1, Page 3, Summary of Paragraphs 9-10](#)).
- G.) The private citizen states that he witnessed slag deposits left in place at Riley Park during remediation activities and when on-scene-coordinators were asked why it was left in place the response was because they were finding it in everyone's yard. ([See Source 1, Page 4, Paragraph 4](#)).
- H.) The private citizen wrote concerns that large volumes of contaminated soil remain at many properties included on the NPL delisting proposal because of incomplete removals. He also cites removals that were not conducted under trees, shrubs, and hardscapes ([See Source 1, Page 4, Paragraph 4](#)).
- I.) The private citizen lists concerns of failure of action to protect health related to groundwater and subsurface intrusion for exposure pathways: toxic particles in groundwater, respirable dust in contaminated groundwater sediments, and fate of toxic particles moving through groundwater not recognized/thoroughly investigated/evaluated by US EPA or IDEM in over 30 days ([See Source 1, Page 4, Paragraph 6, List #1-3](#)).

- J.) The private citizen submitted questions asking why US EPA refuses to take samples of sediments within people's homes as part of the ongoing groundwater monitoring program and responded to flooding events in the last two years at the site (See Source 1, Page 4, Last three paragraphs).
- K.) The private citizen states that delisting the properties without a full and complete investigation of routes of exposure is a concern of public health (See Source 1, Page 5, Paragraph 2).
- L.) The private citizen lists concerns related to delisting and child blood-lead levels (See Source 1, Page 4, Last Paragraph).
- M.) The private citizen describes a basement in Zone 2 that a resident has asked US EPA to test, but delays in samplings have been experienced (See Source 1, Page 6, Summary of Paragraph 4-5).
- N.) The private citizen describes concerns related to environmental justice (See Source 1, Page 6, Summary of Paragraphs 8, 10-11).
- O.) The private citizen asks why actions are not being taken by US EPA for: known off-site sales of Slag, known use of contaminated soil/smelter waste for backfill, known incidents of buried wastes within the site and aquifer, known frequent and/or seasonal basement flooding within the site, subsurface intrusion of contaminated groundwater and toxic sediment into residents homes (See Source 1, Page 7, Summary of Paragraph 3, List 1-5).
- P.) The private citizen shared a source recommendation that included coordination efforts between US EPA and residents regarding information arsenic in groundwater (See Source 1, Page 7, Summary of Paragraph 7, 1st sentence).
- Q.) The private citizen lists concerns related to flooding by contaminated groundwater and/or the combined sewer system, dust in homes and the testing rational, drinking water quality, adjacent communities being informed of risks of sampling (See Source 1, Page 7, Paragraphs 1-5).
- R.) The private citizen included an email he sent to Timothy Fischer (US EPA Region 5) of lab results taken on August 9, 2019 for groundwater and sediment samples.
 - a. States concerns for respirable dust hazards in homes from dried toxic sediment residue and air heating systems (See Source 1, Page 10, Paragraph 5).
 - b. Stated that the homeowner asked three times for US EPA to sample the basement and it hadn't been sampled (See Source 1, Page 10, Paragraph 6).
 - c. Metal levels included antimony (49.5ppm), arsenic (203.1ppm), manganese (21,394 ppm) and others (See Source 1, Page 10, Last paragraph).